

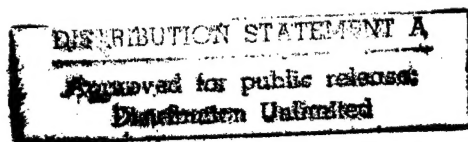
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31 May 1985

West Europe Report

SCIENCE AND TECHNOLOGY



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31 May 1985

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AEROSPACE

VOLVO AIRCRAFT ENGINE FIRM IN ESA PROJECT

Stockholm NY TEKNIK in Swedish 31 Jan 85 p 32

[Article by Jan Lothigius: "Space Is Open for Volvo Flygmotor"]

[Text] In the workshop they are everywhere. Noisy cones of shiny bright metal. They do not appear to be so remarkable, but they cost one million kronor each, and are made of stellite and welded with electron beam welds. They will function for 2 minutes, and then they will be scrapped somewhere between Guyana and the heavens.

Viking rocket engines drive the first and second stages of the Ariane European rocket. The engines' jet exhaust outlets and combustion chambers are made in the Volvo Flygmotor plant at Trollhattan. At the same time development of the next engine generation for Ariane is taking place.

"The space program functions as the driving force for technical development, now that there are no longer any large military development projects at Volvo Flygmotor," said Rolf Andersson, who is the sales director for civilian aircraft and space activity.

Volvo Flygmotor has a 10 percent share in the development of HM60, an engine which will give 100 tons of thrust and is propelled by liquid hydrogen and liquid oxygen.

Cold Conduits

The firm will develop the jet exhaust outlets and the turbines which will drive the fuel pumps. That is their first development work for the space market. The Viking engines for which Volvo Flygmotor is making parts have been constructed someplace else.

The jet exhaust outlet of HM60 will resemble the Viking jet exhaust outlet in form, but it will have an entirely different construction because it will be cooled. The jet exhaust outlet will be formed of pipes with rectangular cross

section which are placed adjacent to each other and welded together. A small part of the fuel will be pumped through the pipes to cool the exhaust outlet.

Seeing Robot

The pipe begins above and goes in a curve down to the base of the cone. Each exhaust outlet will consist of 2,000 meters of pipe, and the same amount of welding.

It is intended that the welding of the pipe will be done with seeing robots which can follow the crack between the two pipes. Volvo Flygmotor is developing this welding technique in cooperation with welding firms.

The turbines which will drive the fuel pumps will develop 8,000 kw and weigh only 10 kg. They thereby give 1,000 times more power per kg than an automobile engine. On the other hand an automobile engine will last longer than the 6,000 seconds which is required of the turbine.

The turbine is driven by a supersonic stream of gas, burning oxygen and hydrogen which hits the turbine at 700 m/s.

Development Tasks

Volvo Flygmotor has signed an agreement with ESA, the European Space Agency, for the development of these parts of the engine. Two hundred fifty million kroner until 1992.

With development costs paid the space market resembles the military market.

"With the important difference that we have competitors in the space market," said Ulf Ohlsson. He is the program chief for space activity.

"Therefore we must first invest a number of million kronor in the project in order to compete in the development tasks, to show that we have ideas."

Today it is a commercial activity to send up satellites. The European firm Ariane Space, in which Volvo Flygmotor owns 3 percent, has already sold all the rocket launches until 1988.

New Fuel pump

Another construction for the space market which Volvo Flygmotor is working on is an electric fuel pump for spaceships moving between different orbits in space. It is hoped that there will soon be an order from ESA for continued development.

Pilot studies have shown that it could save valuable weight to have the fuel-pumps driven by the spaceship's solar cells. The alternative solutions of pressured fuel tanks or turbine driven pumps cause heavier construction.

To store energy in a flywheel when the satellite passes into the shadow of the sun could be a good alternative to electric storage batteries, says Ulf Ohlsson. ESA will soon make an offer for the development of this technique.

"We will be the leading manufacturer of exhaust outlets and turbine and pump systems," said Ulf Ohlsson, expressing the goal of the space activity.

"We start with our competence in welding, plate forming and rotary machinery."

Composites

With a little longer view, Volvo Flygmotor is conducting the development of composite materials for use in high temperatures. Two directions being investigated are silicon carbide fibers in ceramics and tungsten fibers in some other metal.

If materials can be developed which tolerate higher temperatures, the way will be open for increased efficiency of rocket engines and aircraft engines.

Diesel engines can also be made more fuel efficient with such materials. One of the foremost problems which must be solved is to manufacture composites which can be processed.

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CSO: 3698/401

AEROSPACE

FRG SPACELAB PAYLOAD READY FOR SHIPMENT TO LAUNCH SITE

Frankfurt FRANKFURTER ALLGEMEINE ZEITUNG in German 16 Mar 85 p 9

[Article by Wolfgang Heyen: "Spacelab Payload to be Carried Aloft by Columbia in October"]

[Text] Bremen, 15 March. The complete payload, which will be carried into space in the fall on a seven-day research mission primarily dedicated to German science and industry, was given the go-ahead Friday for shipment to the launch site after a thorough technical checkout at the Bremen aerospace company MBB/Erno. The inspection, officially termed a "pre-shipment review", was conducted by the German Aeronautics and Space Research and Experimentation Facility (DFVLR) for the Federal Ministry for Research and Technology.

At the end of April the payload will be transported to Cape Canaveral for installation in Spacelab, also developed and built in Bremen. Spacelab is scheduled to be carried aloft by the American space shuttle Columbia on 14 October.

In contrast to the initial flight of the Spacelab at the end of 1983, this mission, termed "D1", is to use the full capacity of the seven meter long laboratory. The experimenters come from German universities and research facilities, from industry, and from institutes in neighboring European countries. NASA will also use the D1 flight for the testing of materials.

The entire mission, valued at DM 54 million, comprises a wide variety of tasks to be completed in space. In charge of these experiments on board the shuttle will be scientist astronauts Reinhard Furrer, Ernst Messerschmid (both German) and Dutch astronaut Wubbo Ockels. Germany's first astronaut, Ulf Merbold, will be in contact with the crew from the ground.

In addition to the scientific tasks, the project is also significant in that the experience gained will benefit the German space program and help it to remain competitive in the future use of space for scientific purposes. Spacelab's tasks involve primarily interfacial and transport problems, physical chemistry and process engineering, metals and compounds, monocrystals and materials for use in electronics. In conducting these experiments, Spacelab will make use of physical conditions under reduced gravity which can only be realized in space.

German facilities on board Spacelab have been provided by the universities of Aachen, Berlin, Bonn, Clausthal, Frankfurt, Freiburg, Erlangen, Giessen, Hamburg, Mainz, Munich, and Stuttgart, as well as the DFVLR in Cologne and Oberpfaffenhofen, a Max-Planck Institute, the Battelle Institute and the firms of Krupp, MAN and SEL, in addition to scientists from NASA and other countries such as France.

All of the German experimentation equipment was built by German industry, and was combined into one payload and tested by MBB/Erno in Bremen.

Details of the program include experiments in crystal growth in the scientific laboratory of Spacelab, metallurgical solid-liquid interface experiments, the orientation behavior of plants and the hatching of tadpoles under conditions of microgravity (after they have matured into adult frogs, the formation of their organs of equilibrium will be investigated). Two medical experiments will deal with measurement of the internal pressure of the astronauts' eyes and their central vein pressure during the mission. The Biorack payload module will be used to investigate the scientific disciplines of cellular and developmental physiology, as well as to answer questions concerning cell fertilization and radiobiology.

Navigation experiments are to be used to aid in development and testing of a method of ultraprecise clock synchronization and time distribution, as well as for testing a method of unidirectional distance measurement and position determination (with the aid of atomic clocks).

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CSO: 3698/365

AEROSPACE

BRIEFS

NETHERLANDS JOINS SPACE PROJECT--The Hague, 18 Mar--Holland will take part in the development, construction and first flight of an unmanned European Space Agency (ESA) space platform for technological and scientific experiments, a cabinet spokesman said on Friday. The spokesman said the space platform project would be carried out in the context of the ESA's 'Eureka' project. Holland believed participation in the project would help improve Fokker aircraft work's position in the development of solar panelling for satellites, attract further ESA orders and allow Dutch scientists to take part in experiments in the fields of microgravitation and exobiology, the spokesman said. The government also agreed to Dutch participation in ESA's experimental 'Apollo' project, which deals with advanced electronic transmission of documents via broad-band satellite communication channels, he said. An important consideration in this decision was that Holland would thus gain access to the Apollo-ECS satellite multi-service system, the spokesman said. [Text] [The Hague ANP NEWS BULLETIN in English 19 Mar 85 p 5]

CSO: 3698/363

AUTOMOBILE INDUSTRY

DETAILS ON SAAB'S NEW COMPUTERIZED DISTRIBUTOR SYSTEM

Stockholm NY TEKNIK in Swedish 24 Jan 85 p 25

[Article by Ulf Bergmark: "Ignition Box--This Is How Saab's New Ignition System Functions"]

[Text] An ignition system which functions perfectly during the entire lifetime of the automobile and never needs adjustment. That is what Saab says they have built. Volvo was offered the idea in 1973 but rejected it. Saab on the other hand immediately took up the radical idea.

The ignition system contains many new, patent-protected ideas. The key idea is that the ignition coil sits directly on the spark plug. Where normally there is only one coil, here there are four.

This makes it possible to use the same ignition system in power saws, racing motorcycles and conventional trucks. It is a so-called condensor system.

Fireworks

The placing of the ignition coils makes it possible to increase the voltage to 40,000 volts. In the automobiles of today the voltage in extreme cases is 25,000 volts, and generally much lower. Higher voltage creates sparks like New Years fireworks in the distributor and the ignition cables.

In the Saab system there are neither distributors nor ignition cables, which are the weakest links of a gasoline engine.

All the high-voltage parts are housed in a cassette which is mounted on the cylinder head. It is protected against arcing, dangerous sparks and it is furthermore screened against radio disturbances.

If your car refuses to start one morning it is most often due to a problem in the ignition system: Broken distributor cover, burned breaker points, etc.

The system should last over 10,000 operating hours. That corresponds to 20 years of driving time for a private motorist. The system will therefore outlast the car.

The Weak Point

The greatest weakness in the condensor system is the short time which the sparkplug gives off a spark, about 0.1 millisecond. In today's inductive ignition system the spark is 10 times that long. The short sparking time is not always sufficient to ignite the fuel-air mixture in a normal car engine.

Saab technicians have compensated for this weakness by increasing the spark gap to 1.5 mm. With such a large spark gap a car with today's ignition system would not start. But the high voltage of the Saab system bridges the gap and gives a large very hot spark. The fuel is ignited.

The disadvantage of the short duration of the spark can be turned into a great advantage. It will be possible to determine very exactly when the fuel-air mixture is ignited in the engine.

The exactness of the system is also due to the fact that the rotor which distributes the spark is not in a distributor, but directly on the crankshaft. It has an accuracy of ± 0.5 crankshaft degrees, compared with the distributor's ± 3 degrees.

The big advantage with condensor ignition is that the high voltage is built up extremely fast, in 1 microsecond. That causes the engine start, even if the sparkplug is wet and oily!

Secret Project

The very powerful and very exact spark makes it possible to develop the engine itself so that it is both more economical and emits less poisonous exhaust gases. The fuel-air mixture can be made thinner, compression can be increased and the combustion chamber can be further developed. Engine technicians have several--very secret--projects taking place.

Now 100 cars will be driven for 2 years with the new ignition system. The electronics must prove that they can withstand the shock of temperatures under the engine hood, and furthermore can function when the battery voltage is low. With complementary MOS technology it is possible to build an ignition which will function with 3 volts. But then the battery would not be able to turn over the starter motor...

The system will also function if the computer is disrupted. The only thing which happens is that the spark adjustment stops functioning. Furthermore the technicians want to show that the sparkplugs last much longer.

Volvo Reluctant

The man behind the system is Hans Johansson, head of the small development company Mercel in Amal. He has worked with condensor ignition systems for many years, with Husqvarna motorcycles and others.

The idea for the new system came to him in connection with work on an exam at Chalmers in Goteborg in 1973. He tried to interest Volvo, but was told that they were fully satisfied with the Bosch ignition system.

"They were consistently reluctant, and the time was not ripe," said Hans Johansson.

In 1975 he revealed his idea to Per Gillbrand, noted engine expert at Saab. There Hans Johansson met an equal in ability, and the development work soon began.

Now Saab-Scania owns 60 percent of Mercel. A development project at this level is difficult to conduct on a consultant basis. Especially since Hans Johansson also had a consultant job at Volvo. The Industrial Fund has supported the work with 20 million kronor.

A company will be formed which will market the system after it is tested. Then Volvo can buy the ignition system which it once rejected. Today Volvo does not deny that they were offered the idea, but they abstain from commenting.

Caption for first illustration: All the important parts of the ignition system are enclosed in a cassette which is mounted directly on the sparkplugs. A pulse goes from a rotor on the crankcase of the engine, and is processed in the computer on the right. In a condensor in the cassette the voltage is increased to 400 v. to be finally released in an ignition spark of 40,000 v.

Caption for 2nd illustration: The drawing shows a cross section of the ignition cassette. The small ignition coil sits above the sparkplug.

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AUTOMOBILE INDUSTRY

CITROEN DESIGNS, BUILDS CAR IN THREE WEEKS BY COMPUTER

Paris LE FIGARO MAGAZINE in French 9 Mar 85 pp 118-120

[Text] Just as rumors are saying that Renault may close its Boulogne-Billancourt factory and that Peugeot may be seeking to "smother" Citroen, France seems to be taking on, after the US, Germany and Italy, the challenge of the automobile of the future: France is betting on the computer and robot.

Using a CX as its mechanical basis, Citroen has pushed aerodynamics ahead down to the finest details. Front fenders, for example, are mobile and controlled by the steering. For "Eole" is not just an exercise in styling and technology: it is actually a true car, ready to take to the road in 21st century style. In the passenger compartment electronics is not treated as a gadget. Retractable ultra-flat TV screens, laser turntable for playing compact discs and electronic equipment figures prominently in comfort and safety. An exceptional glassed-in surface and generous interior space confirm the Citroen prototype's aim: a big touring car in a lounge on wheels.

"Eole" is not content to be in the spotlight in Geneva: Citroen's latest inspiration has just allowed the automobile to pass into a new phase in the domestication of the computer: three weeks were enough to move from the drawing board to reality.

Just yesterday the designer's layouts had to be interpreted before a model could be put together which would serve as a framework. In "Eole's" case, the computer has taken over. A computer ingested all the dimensions before putting together a life-size body. The saving? Several weeks.

Use of the computer in automobile design is not revolutionary. Baptized CAD (computer assisted design), this technique has already become a fact of life. For example, a research lab which used to toil more than 10 days in putting the finishing touches on the shape of a windshield today winds it up in less than one day with the help of data processing.

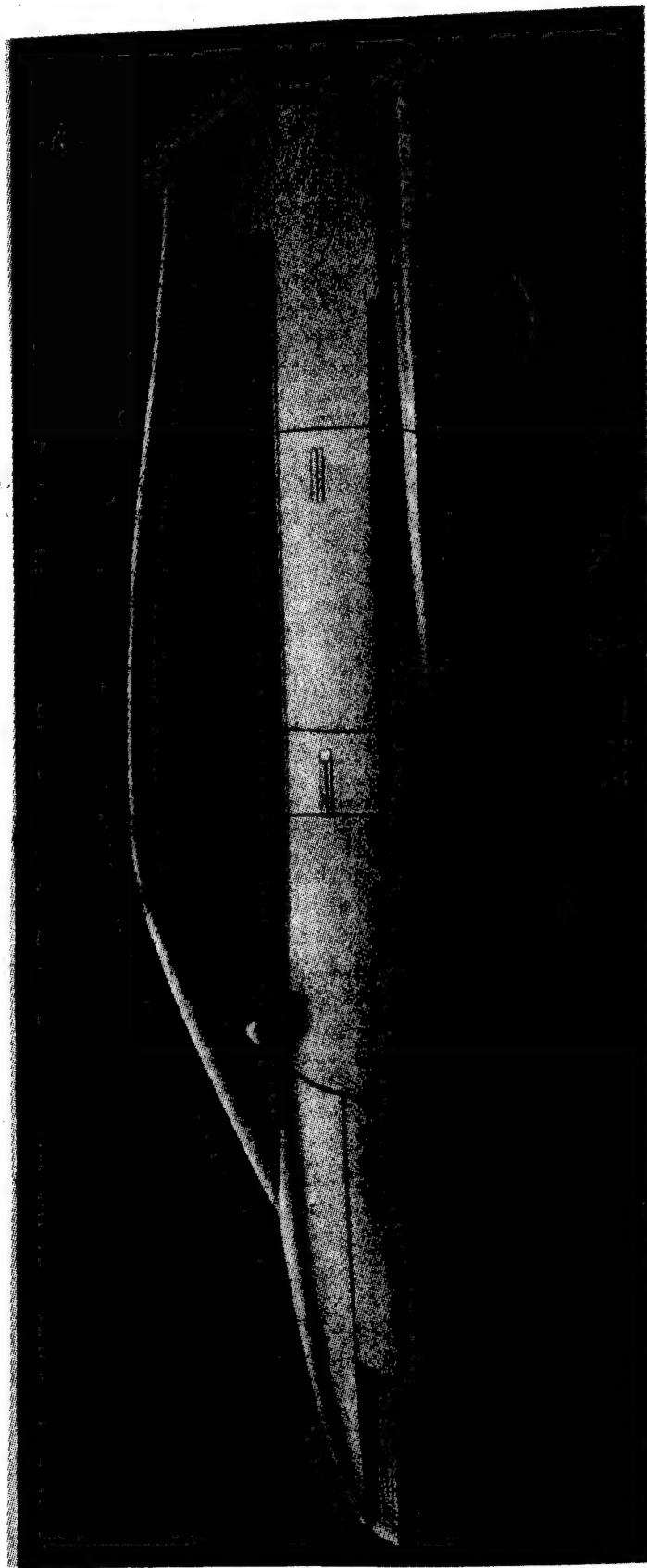
On the other hand, no one before Citroen's "Eole" had dared cut corners by assigning a computer the job of moving directly to interpretation of data under the guidance of a robot responsible for shaping the final body. World record with a double impact: it demonstrates that in the depths of crisis, French automobile research brains have not allowed themselves to be outdistanced by world competition and that the double-chevron brand is making serious preparations for the 21st century which is not far off.

Paradoxically, the "Eole" triumph occurred just as the CGT was putting out an alarming rumor: "Peugeot wants to shut down Citroen. The PSA group has decided to limit the company's activities and reduce it to a satellite." A second rumor a few hours later, but this time targeting Renault: "The Company wants to close its Billancourt plant."

Four thousand Citroen employees would be threatened, more at Renault. Cry of alarm or the first steps in a new destabilization operations?

As of late 1984, the French automobile ensured the income of about 800,000 people. By themselves, the builders totaled more than 230,000 employees and their subcontractors nearly 120,000. "Unbearable situation," according to the experts. The Dalle report released in the fall concluded that between now and 1988 nearly 54,000 construction jobs and 20,000 supplier jobs will have to be cut.

"Hypothesis established on the basis of production volume equivalent to that of the first half of 1983." But meanwhile, difficulties have worsened, sales have dropped and the final bill could be even higher. The blame? Among other ills, a sharp drop in productivity: "Today Renault and Citroen use 8,000 workers to assemble 1,200 vehicles a day while Fiat uses 6,000 and the Japanese 4,000, the latter announcing that tomorrow the figure would be 2,000." More virulent, the German press has issued, through the newspaper FRANKFURTER ALLGEMEINE, an undisguised political accusation: "Before the advent of the Socialists to power, 80 percent of the French market belonged to the national builders. Today, imports have reached the frightening figure of 36 percent of the domestic market." A miraculous solution? It does not exist for any of the doctors called to the automobile's bedside. Even the temptation to cut back is nothing but an illusion: "As an example," the Dalle report specifies, "pulling back productions from Spain would represent 1,500 jobs for Citroen, from which the 1,200 people now working for Spain in France would have to be deducted (i.e., 6,000 complete vehicles exported, plus parts). The direct advantage in terms of jobs would thus be negligible and the operation to lead Citroen to the loss of the Spanish market in which its share is 9 percent." Conclusion? "If we want to avoid collapse," one of the experts recently confided, "there are not two solutions. We must roll up our sleeves and accept the loss of 54,000 jobs. There is still time because the French automobile is not dying. It is just sick and nothing in that field is certain." Witness the Fiat example. In the early 70s the Italian industry leader was on the brink of the abyss. Draconian cutbacks, reorganization and above all a complete updating of the line coupled with enormous imagination put Fiat back in the saddle. In late 1984 Fiat again ranked as a European manufacturing leader.



The Citroën Eole

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CSO: 3698/354

VW BUILDS CAR WITH AUTOMATIC ANTI-SKID SYSTEM

Duesseldorf VDI NACHRICHTEN in German 7 Dec 84 p 27

The Passat Station Wagon Syncro is the first VW model to be equipped with the automatic anti-lock braking system (ABV = automatischer Blockier-Verhinderer). The newly introduced vehicle with permanent four wheel drive was given a redesigned semi-trailing arm rear axle with torsion support members and more rigid shock absorption components. The model has a 2-liter engine, delivering 85 kW and a top speed of 182 km/h. Price is approximately DM 34,000.

A two door station wagon with permanent four wheel drive is not currently offered by any automotive manufacturer--except for VW, with its Passat Station Wagon Syncro, this according to marketing strategists at VW, who maintain that the new vehicle has virtually no competitors. Cars with manual lock-in four wheel drive are not a comparable alternative "for drivers looking for a fast and comfortable vehicle that ensures safe road-handling under practically all conditions," according to VW literature.

The "higher value vehicle" costs approximately DM 34,000 and represents the top of the company's line because technical innovations originating there have proven to have the greatest acceptance in the marketplace. With a planned production volume of 9,000 units for introduction worldwide in the first 12 months of sales, the corporation will hardly have to strain in order to hold its own with the "Syncro." The 5800 vehicles destined for the FRG (1900 for Europe, the rest for the United States [sic]) will find their buyers in a precisely analyzed and established target group which has been narrowed down to professional devotees of driving as well as "auto enthusiasts" and hobbyists.

Whether an auto enthusiast or a professional driver, an additional increase in traction power is added to the already better traction on wet, slippery and slick roads provided by the permanent four-wheel drive, as well as better safety in curves taken at high speeds and more traction when pulling a trailer on slick terrain and inclines. This additional increase in traction power is made possible by two differential locks: by locking the differentials of the distributor shaft and the rear axle, the tractive power in extreme conditions can be further increased.

The suspension system was adapted to the characteristics of four-wheel drive performance by adding approximately 30 percent stiffer springs and rigid shock absorption components. The front axle is almost identical to that of the normal Passat model. The rear axle is a new semi-trailing arm design, with a torsion member which has been equipped with an additional stabilizer bar. The brake system was able to be expanded in size and now features 256 mm diameter brake discs and 54 mm piston diameter brake calipers in the front. The rear wheels have disc brakes as well.

Together with the sporty five-speed transmission, the 2-liter five cylinder fuel-injected engine takes the Syncro up to a top speed of 182 km/h (85 kW at 5500 rpm; 164 Nm at 3200 rpm). Despite a vehicle weight which is 160 kg heavier than the front-wheel drive version (1105 kg/1265 kg) the acceleration of the four wheel drive car, given as 11.1 seconds from standing still to 100 km/h, must also be considered sporty. Fuel consumption figures from VW (90 km/h, 120 km/h, city cycle) are listed at 7.6 liters, 9.7 liters and 12.5 liters per 100 km respectively. The capacity of the blown fuel tank is 70 liters.

Because of its four wheel drive and differential locks, the 2-door station wagon is well-suited to trailer towing. For a braked trailer the maximum weight is 1500 kg, however with a permit the maximum trailer load may be extended to 1800 kg.

Standard equipment on the vehicle includes power steering, luxury-sport interior, split rear seat, luggage compartment cover and alloy wheels (6J x 14).

For the first time on a Volkswagen model, an automatic anti-lock braking system (ABV) is being offered as an extra on the Syncro, for DM 3684. The second generation of anti-lock brake systems from Bosch ("ABS") is a three-channel brake system with an rpm sensor on all four wheels. This enables the rear axle to be regulated according to the behavior of whichever wheel locks up first (Select-Low principle).

If demand increases for the Syncro four-wheel drive technology VW is introducing on the Passat Station Wagon, company spokesmen indicate that it will be possible to transfer the system to other, smaller models. Should this transpire, the permanent four wheel drive system will have found "top-level" acceptance at VW as well.

(See photo on following page)

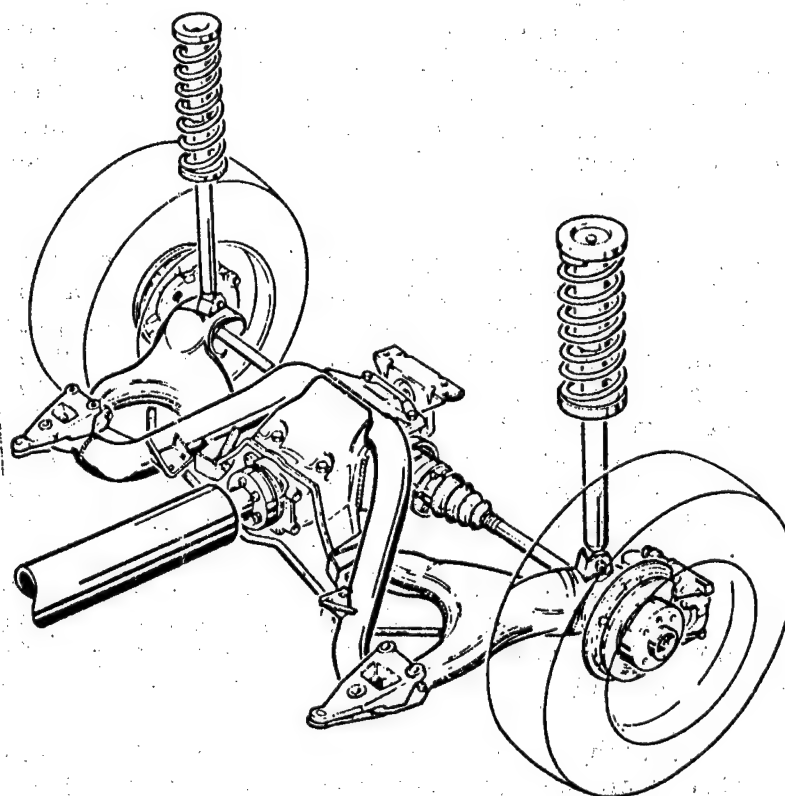


PHOTO CAPTION: The newly-designed semi-trailing arm rear axle for the Passat Station Wagon Syncro features a rear axle cross member which is bolted to the axle drive. The front axle support is mounted to the long members via combination rubber/metal bushings and two bearing blocks. The rear axle drive is attached to the frame members by means of a rubber/metal bushing and a mounting block.

The semi-trailing arms are each coupled to the axle support via two rubber/metal bushings. The stabilizer rod is mounted on the axle support in two rubber bushings and fastened to the semi-trailing arm by one rubber bushing at each point. (VW drawing)

12870

CSO: 3698/322

NETHERLANDS FUNDS BIOTECH RESEARCH AT DELFT-LEIDEN

Rijswijk PT AKTUEEL in Dutch 2 Jan 85 p 15

[Article: "Financial Shot in the Arm for Biotechnology"]

[Text] Biotechnological research in the Netherlands has once again received a boost from the Ministry of Economic Affairs. This time in the form of an annual subsidy of 1.2 million guilders granted to the cooperative alliance Biotechnology Delft Leiden (BDL), which in part through this subsidy wants to expand into a center for biotechnological research of international reknown. However, the largest part of the research costs will have to be borne by the institutions themselves (Delft University of Technology and University of Leiden) that are cooperating in BDL. And that at the same time is a bottleneck. Because the Delft University of Technology in particular will face difficulties in making ends meet with the financial means now available.

The BDL is receiving the subsidy within the framework of the Innovation Oriented Research Program for Biotechnology. This is one of the IOPs [Innovation Oriented Research Program] with which the Ministry of Economic Affairs wants to try to better gear research in the Netherlands to the needs of trade and industry in order to promote industrial innovation. The Program Commission for Biotechnology, which is in charge of completing and implementing the program, conducted a survey among the eight most important companies in our country in the area of biotechnology (Akzo, Avebe, DSM [Dutch State Mines], Duphar, Gist-Brocades, Heineken, Shell and Unilever), whereby an inventory was taken of subject areas that according to these companies need further research. The commission subsequently submitted the research topics to the boards of governors of those universities most closely involved, with the request to come up with elaborated, multidisciplinary, application-oriented research proposals. The research proposal by the BDL, the cooperative alliance between the Delft University of Technology and the University of Leiden, was presented to the commission within 3 months and was at such a high level that it was decided to award an annual subsidy of 1.2 million guilders. This decision was in part based on the large amount of funding that both institutions thought that they themselves would be able to contribute.

For the time being, the annual contributions by the EZ [Ministry of Economic Affairs] to the BDL are in effect for a period of 5 years. If an evaluation then turns up favorable results, the subsidy will be extended for another 5 years. However, the research institutions themselves will still have to come up with the largest portion of the finances. The ratio of the EZ contribution to that of the institutions themselves is approximately one to two.

Thus, when taken together with operational expenses and investments, a total of 45 million guilders is available over the next 10 years for biotechnological research within the framework of the BDL.

However, the Delft University of Technology in particular will indeed face difficulties in completing the program. In a letter sent several months ago by the board of governors to the minister [of economic affairs], a request was made for a much higher amount than what was just awarded: a subsidy of 1.7 million guilders and an annual contribution to operational costs of some 300,000 guilders. The program commission is consequently working on convincing EZ that Delft needs the extra support of "several hundred thousand" guilders in order that Delft's own required contribution to the research program not be threatened.

At stake in the expansion of research at Delft and Leiden are 40 to 45 new jobs. And that too is the beginning of a subsequent problem. Specifically, a very short-term shortage of well-qualified people in this area is expected, according to Professor Schilperoort of the Program Commission for Biotechnology. There appears to be a need in our country over the coming years for at least 50 new biotechnologists a year. There already appear to be problems in filling vacancies. And this problem will over the coming years become only more serious. Consequently, the Program Commission for Biotechnology is working on developing proposals for arranging vocational training so that the impending shortage can be overcome.

Center of Excellence

Intensive and well-organized cooperation between the Delft University of Technology and the University of Leiden in the area of biotechnology has been in existence for some time. There are presently approximately 200 people working within the framework of the BDL cooperative agreement. The areas in which research is being done within the BDL are:

Research on yeast, especially physiological and genetic aspects;

Research on plant cells, the production of plant by-products and biotransformations;

Bioprocess and bioreactor technology, whereby attention is being paid in particular to so-called packed bed units [for ion exchange] and fluidized systems;

The recycling and purification of products of biotechnological processes, with an emphasis on applying column systems.

According to the Program Commission for Biotechnology, it is quite possible that the BDL cooperative alliance will be allowed to grow into a research center of international reknown. The level of the research proposals, the contributions by the institutions themselves, enthusiastic input by the researchers and the intensive cooperation between the two institutions offer good prospects for the emergence of a Center of Excellence that will be identifiable to trade and industry as well.

The research program of the cooperative alliance will be evaluated on an annual basis by experts from trade and industry and the universities. In addition to oral progress reports, the BDL will present an annual report and organize on a yearly basis a symposium on the results of the research.

12271

CSO: 3698/385

BIOTECHNOLOGY

FRANCE OPENS ITS LARGEST BIOTECH CENTER IN LABEGE

Paris AFP SCIENCES in French 17 Jan 85 pp 69-70

[Article: "Inauguration of the Labège Biotechnology Center"]

[Text] Labège--On 10 January, in Labège (Haute-Garonne), Mr Hubert Curien, minister of research and technology, inaugurated the largest French biotechnology research center, which was created by the Elf-SANOFI [Aquitaine Financial Corporation for Hygiene and Health] group.

"Biotechnologies are a vital sector for the future of our economy," the minister stated on this occasion, "and since 1982 they have been one of the mobilizing themes of French research and technology."

Indeed, to learn how to make bacteria or cells produce drugs, to use them to decompose oil and thus control black tides, or to improve seed characteristics, scientists must research biotechnology techniques for many years.

Housed in a building of a futuristic design located near Toulouse, the Labège research center started operating in April 1984 and represents an investment of FF 100 million.

In the field of biotechnologies, international competition is especially keen, and the research center was intended to regroup some 100 researchers. It should therefore constitute an asset of consequence for French research in its competition with Japanese and U.S. groups.

Referring to present weaknesses in certain biotechnological sectors, Mr Romeo Roncucci, director of research at SANOFI, stated that "there could be some competition and gains in some sectors and on certain techniques, but SANOFI could not cover them all."

He also pointed out that the Labège center constitutes a potential research effort backed up by the full power of SANOFI, the pharmaceutical subsidiary of Elf, to use results in production.

The research goals assigned to the Labège teams include the following sectors: health (growth hormones; interleukine), agrifood (seeds, flavors) and indus-

trial products (fine chemicals). Mr Andre Joyeaux, director of the Labège center, also indicated that SANOFI intended "to progress by 10 to 12 percent per year on these new markets."

In his allocution, Mr Hubert Curien also stated that he intended to "propose to the government to set up a three-year priority research program on biotechnology and nutrition." "Experts," he added, "are now working out the main lines of this program and in a few weeks we shall be able to announce the orientations that will be adopted."

Pointing out that French industrial research is too modest compared with that of its foreign competitors, the minister emphasized that the good industrial results obtained by the pharmaceutical sector were largely due to the quality of basic research transfer toward the products marketed.

As for Mr Michel Pecqueur, president of Elf-Aquitaine, he pointed out the importance of the biotechnological sector for the group: FF 3.5 billion in sales and 4,500 people engaged in research and production activities.

The Labège Center

The goals assigned to the research center, which employs about 100 researchers, are in particular to meet the research needs of companies in the Elf group. According to its director, the center should triple its operating capacity during the next 3 to 4 years.

It includes a genetic engineering unit with research ranging from the gene to the cell, its culture on a massive scale and purification of the product. As for the industrial microbiology unit, it is involved in research on the origin of microorganisms, and is doing a lot of work on strains and hemisynthesis.

A phytotechnology unit is devoted to agronomy, using in-vitro methods; applications are geared to plant improvement and the production of drugs or food additives. The center places considerable emphasis on pilot developments intended to optimize processes and take into account all industrial requirements, with preseries production. In addition, an analytical chemistry unit will perform quality controls and biochemical and physico-chemical analyses.

9294

CSO: 3698/403

BIOTECHNOLOGY

FRG ANALYZES STATE OF DOMESTIC GENETIC ENGINEERING EFFORTS

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
22 Mar 85 p 4

[Excerpts] Frankfurt. Basic biologic research and genetic engineering are currently in a very productive development phase throughout the world. The discovery and broad application of new methods in molecular genetics and cell biology led to a considerably increased knowledge of the basic life processes within a short period. In addition, further jumps in knowledge can be expected in the coming decade. Practical applications of these research results are imminent or can be expected with great probability.

c) Great Britain. Despite considerable cuts in general government support for research resources for biotechnology amounting to approximately 25 million pounds annually have been made available in England in the past few years. In 1978, a national program for the manipulation of grain genes was launched in which currently 55 scientists at various institutes and universities participate. For 1981/1982 a total of 2.11 million pounds was available for the government-sponsored agriculture-oriented biotechnology program. In 1983, a new biotechnology directorate was established with an annual budget of 3.5 million pounds.

Private venture capital firms provide at least \$55 million both for American and British genetics firms; another \$21 million for projects in biotechnology were made available through public venture capital. In addition, the Ministry of the Interior is sponsoring a program "Biotechnology in Industry" with \$30 million over three years. In the past few years more than 20 new genetics firms were established in England, some of them by universities or by the government. This makes England the country with the largest number of genetics firms after the United States. A total of 49 companies are engaged in genetic engineering.

d) France. Genetic engineering in France can only be seen in context with biotechnology in general. The latter is given special priority by the government, the universities and private industry. In the period from 1982 to 1985 the French government intends to spend Fr 600 million in support of biotechnology (originally more than one billion francs had been planned for a program "Mobilisateur Biotechnologies"). The government further advocates the establishment of an international center for research in biotechnology, which

is supposed to include the United States and Japan in addition to the European partners. It furthermore strives towards intensifying European cooperation in the field of biotechnology.

The national activities are well coordinated through numerous commissions and government research institutions. On the other hand, in many areas France lacks the critical mass with regard to her own scientifically qualified personnel which is necessary for a broad application of biotechnology, so that it will not be easy to achieve the ambitious goals.

e) Other countries. Significant activities in genetic engineering both in basic research and in industrial research are also being carried out in Switzerland, Sweden and the Netherlands. In addition, efforts in genetic engineering are increasing in:

- Europe: Austria, Belgium, Italy, Denmark, Spain and Yugoslavia.
- Eastern Europe: Hungary, GDR and the Soviet Union
- non-European foreign countries: Australia, Canada, Israel, Brazil and South Africa.

f) European Communities. The European Community promotes molecular genetics and biotechnology within the framework of an independent research program with the following goals:

- Production of improved agricultural and bio-industrial products
- Development of more efficient and safer production methods.

This goal is intended to remove bottlenecks which prevent the application of modern biochemistry and molecular genetics technologies in industry and agriculture. The program is scheduled to run from 1982 to 1986. Financial resources amount to 15 million Ecu, approximately 50 percent of those for genetic engineering.

5. Genetic engineering research in Germany.

In addition to 25 universities and 11 Max-Planck-Institutes the following large research institutions have groups working in genetic engineering:

- German Cancer Research Center, Heidelberg (DKFZ)
- Association for Biotechnology Research, Braunschweig (GBF)

To a lesser degree, work in genetics engineering is also being carried out by the:

- Association for Radiation and Environmental Research, Neuherberg (GSF)
- Nuclear Research Center, Karlsruhe (KfK)

In the period from 1978 to 1983, 580 research projects were carried out in the Federal Republic of Germany. Table 3 gives a breakdown of the experiments according to research areas.

Table 3

Breakdown of Research Projects in the Federal Republic of Germany

	<u>Institutions</u>	<u>Genetic Engineering Experiments</u>	<u>Working Groups</u>
Universities	25	304	62
Max-Planck Institutes	11	93	49
Large Research Institutions (DKFZ, GBF, KfK, GSF)	4	77	22
Industrial Concerns	9	29	-
Other Federal Institutions (EMBL)	3	77	-

As of December 31, 1983

The German Research Association promotes projects oriented towards genetic engineering in 14 special research areas. The key program "Experimental Recombination of Nuclein Acids" was established specifically for genetic engineering. In addition, the Federal Ministry for Research is financing a three-year special program for genome organization and gene expression.

In industry, 16 companies use genetic engineering for product development; of those at least seven firms contract research to universities or genetics companies. In addition, approximately 17 companies are interested in possibilities of applying genetic engineering in their area. So far, six genetic engineering companies have been founded. In the past few years, cooperation between industry and universities, the Max-Planck-Society and large research institutions has been greatly intensified.

Direct support by the Federal Ministry for Research with regard to research projects in genetic engineering is focused on establishing the method of gene recombination at universities, in industry and in the public research institutions. The number of projects receiving direct support shows an upward trend and stood at 29 current projects as of December 31, 1983. Table 4 shows the distribution of projects with regard to topic, number and financial support (without key projects in genetic engineering and institutional support).

So far, three key projects in genetic engineering have been launched: a first one at the University of Cologne and the Max-Planck-Institute for Breeding Research in Cologne-Vogelsang, a second one at the University of Heidelberg including working groups of the German Cancer Research Center, and a third one at the University of Munich and the Max-Planck-Institute for Biochemistry in Martinsried. To supplement the project grants by the Federal Ministry for Research leading German chemical companies have provided these centers with additional financial resources.

Specific tasks in this context are:

- Strengthening the application-oriented basic research and expansion of equipment capacities;
- Intensifying the cooperation between public research institutions and business enterprises to improve the transfer of technology;
- Training young people for industry and science.

The methods of genetic engineering will open new possibilities for medical diagnosis and therapy. A few examples will illustrate this point. Pathogens can be identified through diagnosis more quickly by directly proving their genes without having to isolate the pathogen itself. Thus an infection can be diagnosed before the actual outbreak of the disease.

Genetic engineering permits the production of extremely pure "monoclonal antibodies" of constant quality and in any quantity. They are suited for diagnosing diseases, treating infectious diseases, identifying hormones and for isolating rare natural substances from substance mixtures. New therapy possibilities are being opened up by producing medications such as interferons, insulin, interleukine, urokinase, somatostatin, human growth hormone and others more simply, faster and in sufficient quantities.

Application areas are plant breeding, plant protection, animal breeding, veterinary medicine and food production. It has become possible to implant foreign genes into plants not only in model systems such as tobacco, but also in cultivated plants such as potatoes in such a way that they become a hereditary component. This partially solves the basic problems of gene transfer in plants. Now, genetic engineering is to be used to systematically advance plant breeding. Here, the goals are: higher yields, resistance and tolerance to cold and drought. A second area is the specific improvement in the nutritional value of plants. Thirdly, the adaption of plants which cannot yet be used as cultivated plants to existing climatic and soil conditions should be a long-term consideration. It would also be of interest to transfer genes which can make plants resistant to disease and pests.

The area of nitrogen fixation is also important. Genes have been successfully isolated from bacteria, which are responsible for the fixation of air nitrogen. If it is possible to implant these genes into useful plants and make them effective, the plants will be able to supply themselves with the nitrogen required for growth. Genetic engineering methods can also be used in animal breeding for diagnosing the genotype of domestic animals, to eliminate undesirable accompanying genes and to develop vaccines, for instance against foot-and-mouth-disease.

Apart from the reconstruction of organisms, which could break down specific problem substances in waste water or waste air whose decomposition efficiency is higher or which are, for instance, resistant to heavy metals, a "screening" for new organisms is important which are able to decompose certain substances, which are not affected by the common floras of the sewage treatment plants. Further, there are concrete possibilities of constructing microorganisms which

can dissolve oil slicks very effectively. In the extraction and processing of raw materials genetic engineering can make a contribution both to the development of new methods (for instance the use of biomass) and to cost-effective utilization (such as metal extraction by ore leaching or basic and fine chemicals).

In the past ten years, the risk aspects in genetic transfer experiments have been discussed all over the world. In most industrial nations these discussions resulted in guidelines for work in genetic engineering. The "Guidelines for the Protection Against Dangers Due to Recombined Nuclein Acids" which were issued in the Federal Republic of Germany in 1978 were modelled after the American (1976) and British (1976) guidelines. Experiments in genetic engineering are classified according to several safety levels. Accordingly, the guidelines differentiate between four graduated laboratory safety measures and three graduated biological safety measures.

Table 4

Projects Supported by the Federal Ministry for Research and Technology

<u>Topic</u>	<u>Number of Current Projects</u>
Environmental Protection	1
Agriculture	7
Medicine, Pharmaceuticals	16
Energy, Raw Materials	3
Safety Issues	2

As of 1983

The Central Commission for Biological Safety (ZKBS) monitors adherence to these guidelines. The guidelines apply only to research work which is supported by the federal government, but they are also recognized by the universities and industry on the basis of a voluntary commitment. Experience so far indicates that all entities in the Federal Republic of Germany which conduct genetic engineering experiments adhere to these guidelines.

Recently, in addition to the risks of genetic engineering experiments ethical and legal problems have been discussed which are related to in-vitro fertilization, embryo transfer and the methods of analyzing human genetic make-up. In a hearing of experts held by the Federal Ministry for Research in September 1983 the results of which are published these questions were thoroughly discussed. At present, the Federal Ministry for Research and the Federal Ministry of Justice are jointly establishing a commission whose purpose it is to look further into the issues which were raised in the discussion by experts and to prepare recommendations for measures should these become necessary.

12831

CSO: 3698/348

FRG AIRBUS FINANCING ASSURED UNTIL 1996

Duesseldorf HANDELSBLATT in German 22 Jan 85 p 1

[Article: "Bank Consortium to Provide Long-Term Financing"]

[Text] kr Frankfurt, 21 Jan. The financing of the German components used in the series manufacture of the Airbus appears to be assured over the long term. At the beginning of the week, the Airbus bank consortium and Deutsche Airbus GmbH signed a contract at the Dresdner Bank for DM 2.4 billion which extends the current term of consortium credit to the year 1996. This term extension does not include a credit increase.

With its 50 credit institutions the Airbus consortium, controlled by a group headed by the Dresdner Bank AG together with the Bayerische Vereinsbank AG and including the Deutsche Bank AG, the Chase Bank AG and the West German Land Bank Girozentrale, represents one of the largest domestic bank consortia. It has been available to Airbus GmbH for already more than 12 years.

Direct and indirect federal aid is to be differentiated from financing of the German Airbus components in purely private sector form by capital resources and credit supplied by the German partner MBB and the controlling Deutsche Airbus (DA). Federal aid primarily comprises the anticipatory financing of development costs (repayable) as well as production aid and improved sales financing conditions (non-recoverable subsidies). The bank credit, however, is covered by federal guarantees.

12644

CSO: 3698/365

CIVIL AVIATION

FRANCE'S ONERA STUDIES PROPFANS, WIND TUNNEL TESTS IN 1985

Paris L'HUMANITE in French 9 Mar 85 p 10

[Text] In France do the aircraft manufacturers believe there will be an early return to propellers on large aircraft? Boeing and Douglas state that they were ready in 1982 to put medium-carrier 150-seat aircraft of this type into service. In other words, A-320 competitors, but with propellers. For Aerospatiale, both American manufacturers are primarily trying to "cloud the issue" to embarrass the future Airbus. Research in this field is, however, taken very seriously by everyone. Research is being undertaken in France within the framework of a project delightfully named "Charme."

The matter seems taken for granted. From now to the end of the century, propeller-driven engines which the Americans have baptized Propfan or Freefan but which in France are preferably called "high-speed aircraft with propeller-driven engines" may replace turbojets in transporting 100 to 120 passengers at 700-800 kilometers an hour.

Why this return to the propeller which is associated in people's minds with the birth of aviation rather than with the 21st century? Turbojet performance has reached its limit, the engine builders reply. Something else must be found. "The growing impact of fuel costs in the costs of operating transport aircraft," according to Jean-Marc Bousquet, ONERA engineer, "justifies the renewal of interest in propeller propulsion."

An area in which the Americans, French but also Soviets are striving and one in which the French aeronautical industry must not let itself be outstripped. This was the concern expressed by engineers and industrialists during a meeting with the Association of Aeronautical Journalists.

Research in the US began in 1975 under NASA sponsorship, and two projects, the Hamilton-Standard and the General Electric, are currently under study. In France early research was launched by ONERA. It will henceforth bring together Aerospatiale and Ratier-Figeac, specializing in France in propeller manufacture, in the "Charme" program. The Americans say they can run the first trials in flight in 1978-88 while the French have planned for wind tunnel trials of a model in September 1985 at Modane.

Long research then. Because tomorrow's propellers will little resemble the 4-blade kind which equip today's planes. A Propfan or "propeller-driven engine for high-speed aircraft" is a gas turbine which makes a multiblade propeller rotate through a reducer or by direct hookup. Eight or twelve blades, according to plans. Curved blades in composition material whose finishing touches are still encountering many obstacles, aerodynamic, acoustical or vibratory. In the present state of research, Aerospatiale engineers estimate that with Propfans mounted under the wings, some kind of soundproofing insulation will be needed to make the flight bearable for the passengers. Propeller-driven engines must in addition allow 100-120-seat aircraft to reach speeds equivalent to those attained by the turbojets, 700-800 kilometers an hour. All manufacturers, meanwhile, are meetint to affirm that these Propfans will produce fuel economy of some 30%. A prospect which, in itself, justifies all the research.

These engines of tomorrow will not mean the end of turbojets. At Aerospatiale and SNECMA they consider that the Propfans will not be able for a long time to compete with turbojets larger than the 120-seat aircraft. When Boeing and Douglas speak of planes equipped with Propfan in the light of the A-320, the future Airbus which will be flying in 1988, they are simply trying to "cloud the issue." Nor do the French have any faith in the timetable put forward by the Americans. 1993 would be too soon in their opinion. Be that as it may, the return to the propeller is a technological challenge which no one may allow himself to ignore.

9436

CSO: 3698/354

CIVIL AVIATION

BRIEFS

MARTINAIR CANCELS AIRBUS ORDER--Amsterdam, 1 Apr--Dutch charter airline company Martinair said on Saturday it had cancelled an order for a third Airbus A-310 aircraft and dropped an option on a fourth. A Martinair spokesman said the airline had done this because the charter passenger business had not recovered sufficiently from its 1979 slump. He declined to give further details ahead of the presentation of the company's annual report on April 18. Martinair placed an order in 1983 with the European Airbus Industrie consortium for three A-310's and took an option on a fourth. It took delivery of the first two A-310's in March and November of last year. In addition to these two aircraft Martinair's current fleet consists of four McDonnell Douglas DC-10s and two DC-9 Super-80s. [Text] [The Hague ANP NEWS BULLETIN in English 1 Apr 85 p 7]

CSO: 3698/363

COMPUTERS

NEW FRENCH FIRM COMMERCIALIZING ARTIFICIAL INTELLIGENCE

Paris LE FIGARO in French 1 Mar 85 p 21

[Article by Jean-Louis Peytavin: "Artificial Intelligence Solutions Found"]

[Text] Artificial intelligence is no longer just a topic for conferences. As the firm Framentec is demonstrating, the market is taking off with businesses.

Only operational since January 1984, Framentec is starting off as one of the European leaders in artificial intelligence: it is true that its founders are giving it the means to accomplish its ambitions since they are Tecknowledge (Palo Alto), the world leader in the nature of knowledge, and Framatone.

Artificial intelligence is the discipline which has as its objective "to use one of the high potentials of the computer which is usually considered to be an increasingly rapid and increasingly powerful machine. This is a potential for symbolic calculations, for simulations of human behavior in our activities, for perception, for comprehension and for decision." For Albert Elkouby (formerly of the French Atomic Energy Commission and of Framatome), CEO of Framentec, this application of the nature of knowledge and expert systems opens significant perspectives and "represents a major phenomenon of data processing which will radically change our way of life, dominate our economy and cause significant geopolitical repercussions." Eventually, the use of this technology will represent the main application of computer science, for the areas of the symbolic type where intellectual activity is exercised are more numerous than the areas of strictly numerical representation.

The amount of resources being utilized to create this new potential--especially in terms of gray matter--requires large scale commercial contacts on the worldwide or European level: Framentec presently has eight expert systems in preparation for large firms like Saint-Bogain or Framatome, or even for banking groups and German, English and Italian companies, where the breakthrough of artificial intelligence is moving faster than in France.

On the EEC level, Framentec has just concluded two contracts within the framework of the Esprit program for a sum of 4 million Ecus (Fr 28 million). The first, intitled "Representations of Knowledge and Inferential Techniques

in Industrial Control," will be carried out jointly with Krupp Atlas Elektronik, British Telecommunications and Queen Mary's College. The other, concerning the control of procedures in advanced computer architecture, will be conducted with the Italian partner Cise.

Thus there is research, development and marketing activity in one of the key sectors of data processing for the areas corresponding to the European ambition of a high level for the fifth generation....

In this area, the marketing sector almost has to go through special training in order to understand the significance of this new tool. Since January 1985, Framentec has been offering very high level seminars under the direction of international experts (Daniel Sagalowicz, Bob Engelmores, Bruce Buchanan, Avron Barr, Randy Davis). The next seminar will be held in Paris from 23 to 26 April 1985. It is intended for officials of businesses hoping to solve complex problems which require high level expertise and judgment on the part of the people involved. Several expert systems are presented and explained in detail during workshops. Within the framework of dissemination of information about artificial intelligence (AI), Framentec is also organizing an international seminar, which will take place in Paris, London and Frankfurt (Fall 1985) directed by Feigenbaum, who will give an update on current applications of AI.

Using Lisp-Xerox, Symbolics, VAX and IBM PC equipment, Framentec is currently located in Monaco, but will open its doors in Paris quite soon, in June 1985.

12666

CSO: 3698/374

COMPUTERS

DEVELOPMENT TIMETABLE FOR FRENCH SUPERCOMPUTER MARISIS

Paris L'USINE NOUVELLE in French 25 Apr 85 p 66

[Article by Anita Castiel]

[Text] Supercomputers are a very special kind of weapon. The French have very clearly understood this. For a "technologically advanced" nation, to have to go begging to the United States for computer time or to be at the mercy of an embargo with regard to a supercomputer, as was the case in the Siberian gas affair, is unthinkable!

The future French supercomputer Marisis is positioned within a highly strategic context. A veritable general mobilization of specialists in all fields, under the banner of the Defense Ministry's DRET [Directorate for Research, Studies and Techniques] was officially announced at the beginning of 1983.

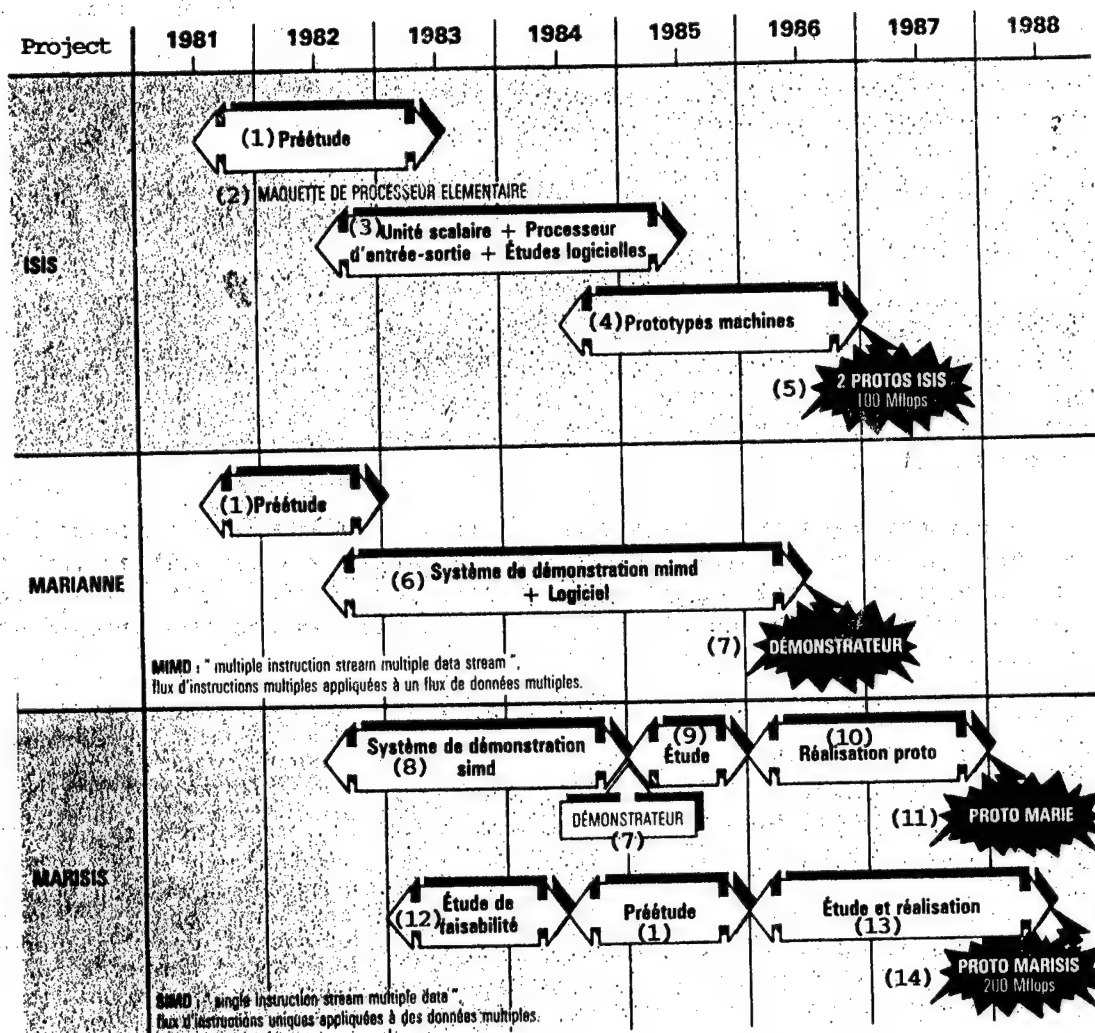
This announcement followed analytic and preliminary study phases begun in 1980. The budget for Marisis comes to some 600 MF [million francs] distributed over a period of 7 years.

The Bull and SINATRA [Industrial Company for New Radio Techniques] firms will be the prime contractors for the project, with cooperating entities from the university and parapublic sectors, such as the Nice and Compiègne Universities, INRIA [National Institute for Research in Data Processing and Automation], ONERA [National Office for Aerospace Studies and Research, Toulouse], and IRISA [Institute for Research in Data Processing and Random Systems, Rennes].

Other entities such as DIELI [Directorate for the Electronics and Data processing Industries], DGT [General Directorate for Telecommunications], DESTI [Directorate for the Scientific and Technical Development of Innovation], and DAM [Directorate for Military Applications] are providing technical assistance for the "big scientific computer" project.

Marisis's laboratory stages are to be completed in 1988. Some will not fail to point out that Marisis's 200 megaflops [million floating-point operations per second] already make it an outdated machine.

Marisis Timetable



Key:

1. Preliminary design study.
2. Mock-up of basic processor.
3. Scalar unit plus input/output processor plus software studies.
4. Machine prototypes.
5. Two Isis prototypes--200 megaflops.
6. MIMD [English and French expansions as above] demonstration system plus software.
7. Demonstrator.
8. SIMD [English and French expansions as above] demonstration system.
9. Study.
10. Design and construction of prototype.
11. Prototype of Marie.
12. Feasibility study.
13. Design study and construction.
14. Prototype of Marisis - 200 megaflops.

By that time, Cray Research should already have commercialized, several months before then, its Cray 2, a supercomputer five times more powerful than our future Marisis and the present Cray 1. By the same time, the advent of the supercomputers rated at several gigaflops [billion flops]-Cray 3, ETA GF-10, HEP II, NEC SX-1--will be imminent... What is involved, however, is definitely a question of strategic necessity, although certain analysts concur in the view of an economic future for the "little" supercomputers by around the end of the century. Little, that is, as compared with the 30,000 megaflops of Control Data's ETAT [as published] GF-30 around 1992.

Marisis resulted from the merger of two older projects bearing the names of divinities. One, named after the republican Marianne, was initialed in 1980 and headed by SINTRA; the other, named after the Egyptian Isis, was launched by Bull in 1981. Their wedding brought forth Marisis.

Isis will be the basic computer. It will consist of an array of 8 to 64 Type SIM D, 64-bit-word, 100-megaflop modular-architecture, synchronous processors. The Isis computers will be integrated into the Marianne multiprocessor system, the whole comprising Marisis. The Isis computers, under control of the Marianne supervisor, will compute in asynchronous mode. Each Isis will apply an instruction to several data at a time as long as its sister computers do likewise. The number of Isises may vary from 1 to 7.

The timetable calls for Isis to give birth to Marie in 1987. This will be a 30-megaflop "bottom of the line" supercomputer designed to make available a marketable performance/price ratio, selling for around 5 million francs.

The initial Marisis configuration will comprise two Isis computers in 1988, for a computing speed of 200 megaflops. But those 200 megaflops are not an impenetrable barrier. Marisis's modular design lends itself to a beefing-up of its computing power.

9399

CSO: 3698/413

COMPUTERS

HEAD OF FRANCE'S BULL DEFINES STRATEGY REGARDING IBM

Paris LE FIGARO in French 20 Feb 85 p 17

[Article by Christiane Guery: "Bull: The Lorentz Strategy"]

[Text] Although the beneficiaries of the Fabius plan are not yet known, the companies involved are already planning for the future, that is, the next product lines to be launched in 1985 or 1986.

Francis Lorentz, general manager of Bull, is pleased about the cooperation arranged with Thomson for the "computing for everyone" plan: "We have submitted a joint bid for the mini-networks. It is important for us to be in the national education market, since that represents the future," and he adds, "It would be dangerous if the majority of French youngsters were accustomed to a competing product."

What will be the Bull group's next strategy? While remaining evasive about a PC line--"to be announced later"--Francis Lorentz makes it clear that his company will not go any lower than a PC. "We'll probably make a portable, but this will still be within the professional market." He anticipates selling between 20,000 and 40,000 Micral 30's this year (two important foreign orders are in negotiation). At the top of the line, to compete with the IBM PC-AT, the general manager is counting on the Questar 400, indicating that it will "run MS-DOS someday" (thus having a certain IBM compatibility).

Apparently then, Bull will not follow IBM wherever it goes and certainly not into the semi-professional domain of the PCjr. This leaves Thomson some elbow room for its 16-bit future, planned, it seems around the Motorola 68,000 chip (like MacIntosh) and the GEM from Digital Research (another Mac lookalike).

And it is quite likely that the Bull-Thomson clusters inaugurated by the Fabius plan will have other continuations. Lorentz admits that a Micral 30 server for primary school "is a bit of a luxury" and that for secondary schools and above, he favors a local network solution (Bull has not yet chosen its local network: Corvus, Microsoft or Memsoft).

For the French company, as for a good number of its competitors, 1985 will be a critical year. "Putting our house in order is important, but that will

not suffice. We must move a lot faster," explains Francis Lorentz, analyzing the "IBM PC whirlwind. It's a race against the clock."

That said, 1984 will not have been a bad year for Bull. The results which will be known within a few days are "in line with everything we had expected," says Lorentz. "I had hoped to do better than what I expected," he added, but the company really took a beating from the dollar: purchases in dollars and sales primarily outside the American zone.

If you disregard the fratricidal struggle of Matra and Bull in the scientific workstation market, 1985 should be marked above all for Bull by the definition of a clear strategy regarding IBM.

Lorentz has politely declined Apple's offer to construct a joint Mac factory in France (contrary to common belief, only Cit Alcatel was in the running), an offer made at the very time when the Micral 30's were being introduced. But, in his opinion, the important problem is IBM. Commenting on the recent European agreement on Unix, he explains: "We must not fight against IBM. It is necessary to coexist, to avoid adopting a closed standard and to fight for the maintenance of free competition."

Clearly, Bull in using Europe and AT&T to create a non-IBM data processing environment, outside the realm of personal computers where the de facto norm of the PC has knocked Bull out of the number one spot worldwide.

As for Unix, Lorentz feels that the influence of the Europeans--and do not forget that AT&T has concluded a comprehensive agreement with the Japanese industry--will make this standard evolve "in the direction of the market." For, to quote an expression of Bull's general manager: "Right now, Unix is a place with few amenities."

French Computers

Like Bull, which introduced its Micral 30, an IBM compatible PC, last December, other French manufacturers are finally going to enter into manufacture of French computers.

Besides Normerel's Oplite (a PC compatible), one must point out the appearance of the Cesar, a machine hoping to occupy the Apple II niche. At a price of from Fr 6,000 to Fr 15,000 depending on configuration, it will be compatible with both the Apple II and the Commodore 64, that is, it will be able to use a large library of software (some 3,000 programs).

Another newcomer: the Guepard will be a product in the PC range (non-compatible) at a price around FR 11,000 to Fr 15,000, depending on the disk readers.

Finally, Exelvision is going to propose a machine to compete with the Amstrad, the British computer which right now is in trouble. The price: Fr 3,200, including monochromatic screen.

Exelvision will, furthermore, try the market with a new line, in particular experimenting with word processing.

OPINIONS DIFFER ON SUCCESS OF EEC'S ESPRIT PROGRAM

EC Experts Cite Successes

Duesseldorf HANDELSBLATT in German 25 Jan 85 p 9

[Article: "Brussels Esprit Plans Fulfill Expectations"]

[Text] Upon conclusion of the pilot phase and first year of a joint research program concerning modern Esprit information technologies, experts within the European Community have labeled the results as positive.

A total of 104 research projects worth a total of 180 million European Currency Units (ECU) in financial aid from the European Community (currently about DM 396 million) have been started according to the experts, who say that the general goal of a convergence of research efforts in this area has already been reached. They went on to say that initial concrete results have been achieved, although it is still too early for a comprehensive evaluation.

The Esprit program, funded in equal shares by the EC on the one hand and by the participating companies and research institutes on the other, was given the final go-ahead in February of 1984 by the council of ministers. Its purpose is to promote industrial cooperation in research and development in five areas of modern information technology prior to open competition in these areas, and to enable the European information industry to be competitive on the world market in five to ten years.

A total of 1.5 billion ECU (approx. DM 3.3 million [as published]) have been set aside for the first five years. The individual areas concerned include advanced microelectronics, software technology, advanced information processing, office systems and computer-integrated manufacturing.

German firms, research institutes and universities are taking part in 67 of the 104 projects for 1984, and a number of them, such as Siemens AG, are involved in more than one project. The EC experts also view positively the fact that each project involves an average of at least five participants, among whom at least two countries within the European Community must be represented. Participation by multinational corporations is also permitted if such participation serves the interests of the Community.

Taking into account multiple participation, the projects for 1984 involved a total of 207 participants. Universities and research institutes, small and medium-sized firms, and large firms participated in 75, 50 and 70 percent of the contracts, respectively.

Deadline is March 25

According to sources in Brussels, 441 suggestions were presented although participants had only six weeks for project selection. These amounted to 1.75 billion ECU, or five times the funds available for the 1984 projects. The manufacture of a demonstration chip, an initial patent and the preparation of design regulations for computer-integrated manufacturing were cited as initial concrete results.

The period for new 1985 projects began in December and runs until March 25. This year, even stronger emphasis is to be placed on industrial goals.

In this regard, the EC Commission cites the strategic nature of the Esprit program, which is to establish an overall concept together with activities in the fields of telecommunications and biotechnology. In the fall of last year the council of ministers had agreed upon initial steps toward opening the public telecommunications markets, unification of standards and financing of a biotechnology program. A beneficial side effect of the Esprit program, the experts say, is the unification of standards.

FRG Firms Have Problems

Duesseldorf WIRTSCHAFTSWOCHE in German 1 Mar 85 pp 56, 57, 60, 63

[Article: "Esprit Funding Program: 'Consistently Deceitful'"]

[Text] The euphoria in Brussels over the mammoth European technology program Esprit has not yet been reflected in large sectors of the German economy. Innovative small and medium-sized firms feel they are being pushed aside by bureaucratic hurdles and powerful companies.

What took place on February 6--just short of a month ago--in the noble halls of the Palais de Congress in Brussels was not exactly a shining example of professional organisation. The panic of fast-approaching deadlines seems to have gripped a good 700 European managers and company representatives as they abruptly turned the planned presentation of information concerning the second round of the Esprit program (European Strategic Program for Research and Development in Information Technology) into a matchmaking bazaar. And for good reason, because with no liaison with at least one industrial partner from other EC member nations--as specified in the regulations--applications for funding are not worth the paper they are printed on.

In the meantime, the EC contact center was a flurry of hectic activity. Lists of participants, for example, were not available, nor was a detailed agenda.

Some candidates had wearily spread literature out on the carpet, and others ran fidgeting through the aisles: "Who are you? Are you interested, or do you know somebody?"

Their haste was understandable, since deadlines were short: By the 15th of February--before the big carnaval celebration, of all times--those in charge of the Esprit program in Brussels required submission of a summary of all applications which must be formally submitted in meticulous detail by 5 PM March 25 for evaluation.

These applications for subsidies are big business--50 percent of the project costs are to be borne by Esprit. The Europeans intend to spring for about DM 3.3 billion in just the first half of the ten year period for which the Esprit program is scheduled to run. The aim of powerful financial infusions such as this is to encourage supranational cooperation in research and development and to catch up to the Japanese and Americans in the field of modern information technologies. Through technical vision the initiators of the program want to convince Europeans who have grown weary of the EC that the Community indeed is of value (WIRTSCHAFTSWOCHE Vol 32, 1984).

For a start, the Esprit organizers in Brussels are patting themselves on the back in self-satisfaction. "The program," rejoiced the EC Commission, "has a lot of takers." Indeed, considerably more than 400 applications were submitted for the initial phase of the technological greyhound race which began in 1984. Of these 400 applications, however, all but 104 were turned down (see table).

Juergen Schulte-Hillen, head of Scientific Consulting in Cologne, has learned his lesson after four failed applications: "This is a crash program. They don't check haphazardly, but with great scrutiny." With such scrutiny, in fact, that applications are returned unreviewed after three months because, according to Schulte-Hillen, "a minor detail in the address wasn't right."

Such mishaps are certainly an indication of the number of problems associated with the Esprit program which plague primarily small and medium-sized firms. Dischord is also evident in the Technology Center of the Association of German Engineers (VDI) in Berlin. The fact that records and forms written in German take an unusually long time to process is "by this time shamefully unfair", according to Harald Bostroem, head of VDI Information, who claims to have observed how French and British applicants make the best of the matter: "They participate intensively in the program, sending off mountains of lists of companies who are looking for partners."

Startled by such hyperactivity on the part of its EC neighbors, the Ministry for Research and Technology in Bonn appears now to want to help small and medium-sized German firms into the Esprit program more strongly than before. Employees are to be paid from BMFT funds specifically to take on such tasks at the VDI because, as Bostroem put it, "it's about time a systematic service was established." Consultant Schulte-Hillen already had discovered this loophole, and tied together a thick consulting package. Klaus Neugebauer, head of Softlab GmbH in Munich, a software company with 220 employees and annual sales of

DM 55 million, is one of the most zealous but also one of the most aggressive proponents of medium-sized company participation.

The thorn in his side is above all the goal established by Esprit, according to which large-scale projects of Type A--with a project volume which frequently exceeds 10 million ECU (around DM 22.3 million)--are to receive a 75 percent slice of the pie. According to Neugebauer, "These percentages and the length of up to five years for such projects exceed the capability of small and medium-sized companies. They are excluded from doubtless highly innovative developments." Neugebauer has not yet observed great willingness on the part of large companies to involve smaller partners to a sufficient extent in the projects. And as a subcontractor, says Neugebauer, "a company is not involved in the project to the extent that it can come up with really good results."

However that is precisely the goal of a joint campaign of medium-sized German data processing companies and their 16 member companies (Impuls)--Neugebauer is the chairman--which together with the European association E III (European Independent Informatics Industry) wants to counter the lobbying efforts of large companies in Brussels. The EC should establish a funding program which is "specially tailored to the needs of innovative small and medium-sized companies." The bottom line with regard to the Esprit program, according to British E III President Peter Hall, is that "in the final analysis, the program has again benefitted only large companies."

This is an accurate assessment, even though each project in 1984 had an average of five participants. Whereas the commission's list of approved applications for 1984 contains a preponderance of big names--but also universities and research institutes--looking for the names of small and medium-sized firms is like looking for a needle in a haystack. Immediately evident, on the other hand, are groups like Siemens and Philips, the British firm of General Electric Co. together with the state-owned French firm of Thompson-CSF and the Italian Fiat subsidiary Comau together with Renault and Digital Equipment GmbH of Germany. This trio intends to attack a research and development project dealing with computer-integrated manufacturing (CIM) at a total cost of over DM 32 million.

The fact that no less than the IBM Corporation, a giant in the field, has its hand in the Esprit till via its German subsidiary has caused quite a stir. Behind IBM's back, envious participants note with a feeling of distrust that the projects submitted by IBM primarily involve cooperation and participation by customers of the multinational computer company, and serve to further solidify IBM's already dominant market position.

Massive Run on Esprit Funds

Distribution of the First Esprit Program (1984) Shown by Product Group and National Participation

Sector	National Company Participation				
	Number of Approved Projects	Great Britain	France	FRG	Italy
Advanced microelectronics	28	18	18	17	6
Software technology	14	9	9	10	7
Advanced information processing	20	13	12	11	12
Office systems	23	14	15	16	15
Computer-integrated manufacturing	19	13	10	13	9
Total	104	67	64	67	49

Source: Financial Times

If concrete information from the EC offices is sparse, rumors and second-hand information abound. Munich consultant Heiko Mehnen, vice-gerent of the Belgian information pamphlet "Eurotech-Forum", for example, likes to refer to information extracted from "various sources, some of which are within the EC Commission." This information is strong medicine. "It has come to light," the pamphlet says, "that roughly 55 percent of the DM 400 million or more in aid from the first Esprit program was granted to the twelve giants of European information technology." What is even worse, these companies, all members of the "Round Table Committee", belonged to the management group whose main goal was the approval or rejection of projects.

This type of behavior is vehemently denied not only by the task force responsible for the Esprit program within the EC Commission, but also by Siemens. For Jens Moritz, R&D manager in Siemens' central division for research and technology, discussion of the subject is superfluous: "Of course those twelve receive the lion's share of funds, but they're financing 70 to 80 percent of the research and development of these technologies in Europe." In addition, he says, many Siemens Esprit projects are not "closed societies," but rather are also open for smaller innovative partner firms. Moreover, real fundamental research is in demand because, Moritz says, "as soon as we approach the

marketing stage of a product, the sensitivity of the participants increases and cooperation is made more difficult."

Jan Witt, software development manager of the Munich-based Periphäre Computer Systeme GmbH [Peripheral Computer Systems] with 250 employees and DM 45 million in annual sales, calls this justification, which sounds so plausible, "consistent deceit." "Activity on a company's own projects," says the ex-Siemens employee, "is closely involved with product development, due not least of all to the increasing pace of innovation." In the meantime, applications have been piling up on Witt's desk from companies who would like to join up with PCS for Esprit projects. But he turns them away. "In reality," the software expert confides, "they're only looking for a partner for the list, because that increases their chances of having an application accepted." But this type of "fantasy shield" (Witt) is not altogether cheap for those who believe in it, because the larger and the more European the consortia are, the higher the pure administration, personnel and travel expenses can be for the joint research project, for example.

These kinds of burdens have put a heavy damper on the initial Esprit enthusiasm of the Berlin-based Gesellschaft fuer Prozesssteuerung und Informationssysteme mbH (PSI) [Process Control and Information Systems Company]. Together with nine other companies and universities in France, Ireland, the Netherlands, Italy and the FRG, PSI is working on an Esprit project for the control of CIM robotics systems. "Balancing the interest among so many different partners is difficult," complains Wolfgang Dedner, head of development of the company with 240 employees and just under DM 30 million in annual sales. The Brussels procedure is complicated, he says, the expense for coordinating such an international joint project is "very great," and the project is "hardly suited" to small and medium-sized innovative companies oriented around short- and medium-term goals.

In the face of all dissatisfaction, Harald Bostroem of the VDI Technology Center still has not thrown in the towel, and prefers to develop suggestions as to how the potential funds can be better and sooner obtained (see box). And he shows diplomatic understanding for the "sand in the gears" of the Brussels machinery: "The process must first go through a break-in phase."

Nevertheless, many of those annoyed at the way the Esprit program is run are not lacking in self-confidence. In a survey of the members of the joint campaign of medium-sized German data processing companies, one company justified its intended withdrawal from Esprit projects as follows: "We are afraid that we are not receiving enough compensation for the transfer of our know-how to large companies."

[in box] Requirements for Application

According to the recommendations of the Berlin VDI Technology Center, careful preparation and flexible reaction to the "peculiarities of this EC initiative" are important requirements for a firm which wants to become part of the Esprit funding program. Esprit offers attractive subsidies of up to 50 percent of research expenditures, but applications for the current phase of the program

must be in by March 25. In spite of the short deadline, it is still not too late for German firms--as long as they have developed a finished concept, have joined with at least one industrial partner from another EC member nation or can join in on a project currently under way. Some good sources of information--for future Esprit projects--are:

- the annual spring information conference with detailed explanations held in Brussels;
- the Brussels Technical Weeks, held in the fall, with workshops and possibilities for making contacts;
- the "Esprit '84 Status Report of Ongoing Work" as a means of determining how one's own company measures up within the technical framework of the funding program, and
- the 1985 Esprit schedule as well as application forms to help in the submission of an application. These forms are to be sent to the Commission of the European Community, Information Technology Task Force "Esprit", Rue de la Loi 200, B-1049 Brussels.

VDI consultants say that even now companies should begin preparing for 1986 projects. Factors to consider are, for example, the state of the art of the company's own technology, goals of development, the technical significance of the proposed development as well as the qualifications of both the company and its employees. In addition, project organization should be considered, and should involve an accurate timetable and a schedule of costs, including an appropriate amount for overhead. It is already time to begin looking for partner firms, and a joint concept should be worked out. There are still good chances for companies located near national borders. This also applies, for example, to the "software technology" funding program, where according to the VDI only few applications have been submitted in relation to the potential volume of available funds.

12644

CSO: 3698/367

COMPUTERS

CRAY 1M AT BERLIN COMPUTER CENTER FOR VECTOR RESEARCH

Duesseldorf VDI NACHRICHTEN in German 28 Dec 84 p 14

[Excerpts] The Konrad Zuse Center for Information Technology (ZIB) was officially opened in late November. Prof Dr Hans Westmeyer, the senior vice president of the Free University and chairman of ZIB's board of directors, said that the new facility was the successor to the Main Computer Center for Science in Berlin historically speaking, but that it was designed to be more than just a computer center in the classical sense. Pursuant to the legislation that created it, ZIB is to engage in R & D in information technology and to satisfy the concomitant service sector needs.

To fulfill this task, ZIB has a Cray Research vector computer at its disposal, the first such piece of equipment among the universities of northern Germany. Berlin has entered a cooperation agreement with Lower Saxony and Schleswig-Holstein, allowing those two Laender to use the facility as well. But the next vector computer will already be going into operation in Hanover in the spring of 1986.

A news release by the Berlin working group for parallel computers explains in what ways vector or parallel computers such as the Cray 1M differ from other computers: the command storage unit of a vector computer not only contains the customary arithmetic computer commands for individual numbers but also vector commands which perform similar operations for columns of numbers (or vectors). Every vector command triggers a large number of overlapping operations, which is a decisive factor affecting the high performance of such a computer. Such overlappings can also be obtained with high-performance conventional computers; but in the case of vector computers the flow of operations and the control function are specially coordinated.

At the official opening on 22 November, Prof Dr Wilhelm A Kewenig, Berlin's senator for science and research, welcomed Prof Konrad Zuse who, he said, "invented and built the first program-controlled computer in the world here in Berlin." The center, which was named in his honor, is to operate along interdisciplinary lines and maintain close contact with the universities, providing a link between research-oriented university projects and production-oriented problems of industry. Although ZIB is a public institution, it is to be operated according to management principles. During the first year of operation, however, access to the Cray 1M computer will be free for some Berlin user groups.

9478

CSO: 3698/387

FACTORY AUTOMATION

ITALIAN MACHINE TOOL SHOW HIGHLIGHTS HEAVY EQUIPMENT

Bern TECHNISCHE RUNDSCHAU in German 4 Dec 84 pp 26-31

[Article by Kurt Haeuser: "BIMU of Milan, Italian Machine-tool Building on the Upswing"]

[Text] Because of the extensive exporting of Italian machine tools (in 1984, for a probable 1.4 billion Swiss francs) and also the relatively large importing (in 1984 for about 0.5 billion Swiss francs), the BIMU [Biennial Italian Machine Tool Show] in Milan is one of the barometers of activity in the Italian machine-tool industry. The large volume of imports resulted in a large foreign participation. The number of exhibitors and the floor space were about the same as 2 years ago.

The gross exhibition area of the BIMU is almost twice as large as the net area. That is a token of how spacious the layout is of this exhibition.

In its structure, the BIMU resembles an EMO [Hannover Trade Fair]. No other national exhibition manages to have the same classification according to types of machine tools. Sometimes one is even tempted to assume that the classification of the BIMU is more strict than that of an EMO held in Milan.

Whoever did not know about the setbacks of Italian machine-tool building in the years 1981 to 1983 would have to assume on the basis of what was offered at this year's BIMU that the Italian machine-tool industry has been spared from the worldwide crisis of recent years. To be sure, here and there exhibitors known from former times were missing, and others had occupied larger booths, but the one or the other seemed content with less room. The small machine-tool manufacturers which notably increase the number of Italian exhibitors at an EMO in Milan were entirely missing.

Heavy Italian Machine Tools Push to the Forefront

For the experienced visitor, the hall with the heavy machine tools offered many surprises, above all the massed presence of this branch of the Italian machine tool industry. Although the frugal exhibiting of heavy machine-tool building in past years, even at the 4th EMO in Hanover in 1981, may have led to a certain becoming disaccustomed to the sight of such machine tools, that was not the sole reason for the effect of surprise. Italian heavy machine tool building has always been very export-active, and it is

achieving a very high export ratio. That is likely to be one of the reasons why this branch of Italian machine-tool building feels very bound up with technical progress and makes every effort to keep up with world technological standards. Not without pride it has been said: "We have advanced into the front ranks of the manufacturers of heavy machine tools. What prevents us from ourselves someday capturing the top position?"

Despite increasing numbers of unemployed people, the "automatic factories" and the "new" machine tools required for them are at the heart of present developments, and with great probability of the manufacturing technology of the future as well. What is understood by the "automated factory," also called "unmanned workshop," or by the workshop itself "lunchroom or loafer shift," is production without any direct human help during the entire process. This year's BIMU viewed it as one of its objectives to awaken interest in this kind of production even among the small and intermediate industrial outfits. As was shown by the many automated and concatenated machine tools, production islands, production chains, and production systems, all the fields of Italian machine-tool building had jumped at these ideas. Prompted by the exceedingly extensive offering, many a visitor asked himself again and again the question: "Where are the enterprises which will buy all the production equipment exhibited here?" Looked at more closely, many a piece of equipment gave evidence that it had been assembled exclusively for the exhibition.

Numerous Innovations and Improvements

Of course, an exhibition on the scale of a BIMU presents many innovations and improvements during an upswing period. The times when trailblazing new developments could be expected have long since passed. Added to this is the fact that in 1984, too many similar exhibitions took place too close together, far more than ever before in one year. Thus at the many exhibitions not only does one always see the same exhibitors, but frequently also the same visitors.

We can present only a few examples from the extensive line of products offered. We hope that we have chosen those exhibits which have a large range of applications and which indicate the probable course of further developments.

Turning

In the last decade of the previous century there were already devices for unassisted loading and unloading at the machine tool. At that time, nobody felt them to be a sensation, let alone "job killers," but merely to be what they really were--namely, a means of facilitating work and an opportunity to increase manufacturing output. In contrast to today, at that time nobody thought of replacing the man at the machine. If it proved possible to have a multiple machine assignment, initially limited strictly to two machine tools, then that contributed to reducing the shortage of skilled workers already well-known in the previous century.

Loading and unloading devices, often called by many other names as well, can be connected in various ways with the machine tools: As a component built into the machine, attached to the machine, or mounted separately from the machine. Within the individual groups there is a variety of gradations as well. For example, "attached to" can mean that although the feeding unit stands apart from the machine, it has a fixed position and likewise is controlled by the machine control system, or that although the unit is secured to the machine, it nevertheless has its own control system. In recent years, the separately-standing feeder device, mostly in the form of a robot, has been preferred. Only in special cases has the designer included a certain feeder device in the planning of the machine. For external feeder devices it is sufficient to provide for the necessary room, for example in the machine work space, so that the gripper can reach in from above. The floor-area and space requirements of feeder devices are now becoming increasingly more important, and likewise the desire to use such equipment also for smaller numbers of pieces. This is resulting in developments in the direction of building feeder devices into the machine once more in the case of lathes, so that when a workpiece is exchanged for another, they can hold similar unmachined parts, for example slugs with differing lengths and diameters, after a brief tooling change-over.

The built-in loader and unloader of the lathe with CNC [computerized numerical control] in Figure 1 can be reset quickly and easily. It is designed for the clamping and unclamping of pre-elongated cylindrical or drop-forged parts--provided that the gripper can grasp them. In addition to turning, powered tools also drill and mill the workpieces held in the chuck. When deposited, the finished workpiece shoves the workpiece previously machined one step further in the depositing trough each time, while an unmachined part is taken from the feeding trough and is carried to the chuck by a swiveling motion.

What has been suitable for small numerically controlled lathes for a long time seems suited now to large lathes as well. For the heavy lathe in Figure 2, the rotary motion of the work spindle is included in the program as one axis, and the attached tool turret head is tipped with several rotating tools. In order to carry out as many machining operations as possible on the workpieces in one chuck setting, additional replaceable milling and grinding units are available.

Grinding, Lapping

In addition to lathes, in Italy the building of grinding machines has a long tradition also. Almost all types of grinding machines are being built, including heavy roll-grinding machines. But the primary emphasis lies on small and intermediate designs. These include also universal grinding machines such as is shown in Figure 3, for example. On this machine, the spindle head can be adjusted by any given angle up to 360°, and the grinding-wheel head can be adjusted by 4 x 90°. The picture shows the setting for the face grinding of flat surfaces. Rotating the grinding-wheel head by 90° makes this machine suitable for outside or inside cylindrical grinding. On the opposite side of the workpiece spindle is a machine-tool center for between-center grinding of workpieces. For the

grinding of tapers, the workpiece spindle head can be adjusted to the desired angle, or else the CNC control guides the grinding wheel along the taper surface. Due to this manifold grinding in the same workpiece chuck setting, all errors caused by rechucking are eliminated.

The grinding machine for longitudinal and angular infeed grinding shown in Figure 4 grinds several diameters in one workpiece clamp setting. It is intended primarily for short runs and for subprograms which change often. In connection with many subroutines, powerful CNC control units permit the execution of complicated grinding operations. The subroutines reduce the programming to the input of a few data in the form of numerical values. Subroutines filed in the memory section appear in clear text following their fetching. All wheel-dressing values are automatically adjusted. The right-hand measuring head in the picture touches a vertical shoulder and shuts off the longitudinal movement in the direction of the Z-axis as soon as the workpiece has moved into the desired position. In the angular infeed grinding, the control unit expresses the displacement distances in terms of the diameters. The grinding-wheel dresser trues inclined grinding wheels simultaneously at the periphery and on the side.

In the internal grinding machine in Figure 5, a loading arm (behind) and a pneumatic unloading device (front) are built in for grinding small holes in series production. Despite the grinding range of only 2 to 40 mm in diameter, the driving motor generates 5.5 kW. The rigid design of this machine permits a complete utilization of the drive power. The dimensional control system enters upon a sizing process, or as in the picture upon a "diamond cycle" through a controlled dressing against a fixed diamond and an elimination of dimensional variations by a manual resetting in a range of 0.01 mm by 0.001 mm in diameter each time. If the workpiece dimensions are controlled by a sizing process, this shuts off the grinding process as soon as the workpiece dimensions trigger the signal. Rolling elements in the longitudinal guideways prevent stick and slip, so that the reversal margin is negligibly small. As soon as the grinding wheel starts at the workpiece, the fast-feed advance switches over to rough-machining. For the protection of the operating personnel, the machine is completely covered during the grinding.

What is conspicuous about the universal cylindrical grinding machine in Figure 6 is first of all the many measuring heads. This machine is built in several sizes with grinding lengths from 1,000 to 3,500 mm for workpieces up to 220 mm in diameter. When the grinding length is large, there is always enough time for the grinding-machine operator to attach by hand the measuring clips needed for each diameter. As soon as the measuring wheel head indicates the finished size, at that point the machine ends the grinding or else goes on to the next grinding position. The time at which the operator moves the wheel heads to the workpiece is left to his discretion. In order to minimize the wear of the probes in contact with the workpiece, at the time of attaching the measuring clip the workpieces should already have been ground.

The lapping machine in Figure 7 with a wheel diameter of 1,200 mm was produced in the wake of general developments with respect to the lapping of

even larger workpieces, especially those with packing surfaces. The rotational speed of the wheel is continuously regulatable and reversible between 0 and 35 min^{-1} . In order to shorten the downtimes in changing the workpieces, to the left next to the machine a turntable is mounted, on which the workholders are prepared and loaded with workpieces. Then the change takes place in a manner such that one workholder with unmachined parts is exchanged for a similar one with lapped workpieces. To that end, the workholders are to be moved to a transfer plate and from there further into the vacant position of the turntable which stands off to the side. The turntable considerably shortens the downtimes of the machine, especially when large numbers of small parts are to be lapped.

Machining Centers, Production Systems

This year, the Germans are among the most travel-crazy of the exhibitors of machine tools. With a large portion of exports to almost all countries, it is hard for them to pass up an exhibition in a foreign country. Moreover in Germany itself there are a number of exhibitions, and furthermore these are as alike as two peas in a pod. Nevertheless export-conscious and innovation-minded German firms are contriving, even at exhibitions in foreign countries, to come up with new designs, such as the high-speed machining center in Figure 8, for example. This machining center is expandable according to the modular construction system, permitting it to be used as a production system even in unmanned shifts. Thus, for example, another magazine for 71 tools can be added. And in this magazine the tools can have diameters of up to 100 mm and weigh up to 10 kg. Other attachments are a pallet station for 10 pallets $400 \times 400 \text{ mm}$ in size. In the working position, the pallets rotate by $4 \times 90^\circ$, so that the workpieces can be machined from four sides and in some settings even from five sides. This machine combines high speeds, for example rapid-motion speeds in the X, Y, and Z axes of 15 m/min , with great accuracy owing to the large hardened steel guideways and the measuring system's discrimination of 0.001 mm . The display screen shows the values of all axes, and also tool breakage and tool wear. A number of machines of this or a similar type can be combined without great effort into a production system and connected to a central computer.

Notwithstanding the many already well-known possibilities for fixing tool magazines to machining centers, designers are still finding additional places, such as attaching them to the drilling and milling center in Figure 9, for example. Here, on the back side of the longitudinal table are two linear magazines for six drilling and milling tools each. If necessary, there is room for other magazines at the front of the table or to the side. To protect against chips and cooling lubricants, roller blinds close up the magazines during the machining. The duration of a change of tools is also determined by the movements of the table and of the tool carriage in coming up to the change-over position. The working capacity is $2,000 \times 1,500 \times 500 \text{ mm}$ (X, Y, and Z axes). For the machining of relatively long workpieces at their top surfaces, hollow spaces are provided in the foundation and coverable openings are provided on the table.

The machining center in Figure 10 is part of a flexible production system, which besides machining centers also includes measuring machines and washing equipment. Loading and unloading devices transport the workpieces from the conveyor belts to the machining stations. In this machining center, during the machining of a workpiece the finished workpiece is removed from the second pallet and delivered to the following machining point or to a conveyor belt, and an unmachined part is put in, with this subsequently being clamped in the chuck automatically.

The machining center for light machining work in Figure 11 has up to eight maneuverable axes: Four or five linear and three rotational axes. The supporting stand moves in the X-axis on a bed up to 3 m in length which is extensible on both sides 5 m in each direction. Moreover the stand can be turned by 180°, so that the machine can also work the reverse sides of workpieces. Meanwhile, the finished workpiece in the first working position is replaced by an unmachined part. In the Y and Z axes, the work lengths amount to 1,150 and 1,350 mm. In addition the work-driving spindle executes a travel (W axis) of up to 60 mm. The cutting head rotates in the Z axis (C axis) up to 360° and at right angles to that (A axis) up to 220°, so that every point on the workpiece can be reached. For additional and complicated machinings, among other things also on hand are a water torch, deburring tools, drilling and riveting devices for drilling and riveting parts with large surface areas, and tools for the machining of carriages made of light metals or plastics.

PHOTO CAPTIONS

1. Figure 1. CNC automatic lathe "Galaxy-Vega" with a built-in loader and unloader for cylindrical and similar unmachined parts. (Esercizio Pietro Pontiggia 1-20025 Legnano/Pestalozzi & Co AG, Riedstrasse 1, CH-8983 Dietikon).
2. Figure 2. Heavy lathe with a distance between centers of 4 m or more, center height of 525 to 800 mm, 60 or 75 kW drive power. (Tacchi Giacomo and Figli S. p. A., 1-2022 Castano Primo/Hch. Reimann AG, Seestrasse 127, CH-8700 Kuesnacht).
3. Figure 3. Universal grinding machine for surface grinding (face grinding), inside and outside cylindrical grinding, profile grinding, and grinding between centers. (Tacchella Machine S. p. A., 1-15016 Cassine/H. P. Mueller AG, Luzernstrasse 104, CH-4554 Etziken).
4. Figure 4. Working space of the longitudinal and infeed grinding machine EDP 700 CNC. (Luigi Moara S. p. A., 1-40132 Bologna).
5. Figure 5. Internal grinding machine "Micro/1" for maximum diameters of up to 40 mm. (Luigi Moara S. p. A., 1-40132 Bologna).
6. Figure 6. Universal cylindrical grinding machine HM/S with several measuring clips. (Co. Me. TA, 1-20029 Turbigo).

7. Figure 7. The largest model SP.3 of a production series of lapping machines, wheel diameter of 1,200 mm. (Melchiorre s. r. l., 1-20092 Chinisello).

8. Figure 8. Working space of the high-speed machining center MC5HS in the standard version with a tool magazine for 48 tools and a pallet turntable with two pallets. (Maho Machine-tool Building Babel and Co., D-8962 Pfronten/Rolma AG, Foerrlibuckstrasse 110, CH-8031 Zurich).

9. Figure 9. Vertical drilling and milling center "Multinorma 4000." (Rotomec S. p. A., 1-15020 San Giorgio Monferrato).

10. Figure 10. Machining center "Auctor 400" in a flexible production system with several machining and measuring units. Capacity: 500 x 505 x 300 mm. (OCN S. p. A., 1-San Bernardo d'Ivrea).

11. Figure 11. CNC machining center "Jomach 16" for light machining work, with eight maneuverable axes. (Jobs S. p. A., 1-29100 Piacenza).

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FACTORY AUTOMATION

ROBOT USE INCREASES IN FRG

Duesseldorf VDI NACHRICHTEN in German 4 Jan 85 p 1

[Text] West German factories started the new year with 6,600 industrial robots; on 1 January 1984, only 4,800 of these could be counted. The use of robots in up-and-coming assembly-line applications even doubled within the last year, it was revealed in the annual inventory made by the Fraunhofer Institute for Production Technology and Automation (IPA) in Stuttgart. But the reality of the numbers in connection with assembly work appears as follows: A growth from 248 to 452 units. As always, spot welding in the automobile industry is still in the lead: The number of units grew from 334 to 1,894. Of these, 1,300 alone are at work for VW, of its own making and for its own production.

With an increase by more than a fourth, the Assembly, Handling, and Industrial Robots trade group (MHI) in the German Association of Machine-building and Plant Construction (VDMA) has even exceeded its "target" for robot applications in the FRG. German firms are accepting the robots. But: 47 percent of the 1,800 units newly used in 1984 came from foreign countries--20 percent from neighboring European countries (for example, Sweden), 11 percent from the United States, and 16 percent from Japan. However, in the total inventory of 6,600 units the Japanese previously had a share of only 10 percent. So this means that Japanese equipment gained ground on the German market in 1984. Meanwhile, the leading European producer is Asea, whose robot division managed to produce 1,600 units in 1984, in its tenth anniversary. As early as in 1985, 2,500 units are to be produced annually. Also Kuka in Augsburg has established itself within the upper ranks of robot producers.

In the long run, only ten large suppliers will probably be able to hold their own in the FRG market, says Dr of Engineering M. Schweizer, main department head at the Fraunhofer Institute for Production Technology and Automation IPA, which prepares the FRG robot statistics annually. Dr Schweizer estimates that in later years only five relatively large FRG manufacturers will be left, since a minimum annual production of 200 to 300 pieces is necessary.

Even today, the "top ten" hold 80 percent of the FRG market. Because of the marketing war, the prices are lower than ever before. But often money is being made--if at all--only on the peripheral equipment. The trend is

clearly heading in the direction of the systems supplier, who simplifies the introduction of robots.

This explains the success of technology-oriented businesses, such as the welding firm of Cloos. This explains also why track welding--used above all in small and medium-sized enterprises--has grown from 478 units to 1,334.

A converse example: Deburring is stagnating, with the growth being zero in a theoretically possible number of 22 applications, because the sensor technology is not yet available. Also the assembly applications--despite a doubling--show that the real thrust is still in the future. Only a very few devices are guided by sensors, and to the question of to what extent intelligent robots are already working in German factories, Dr Schweizer can only answer: "None!"

On the other hand, in those areas whose technology is being mastered the application of robots is growing more widespread. Thus, coating processes (painting, spray-coating, cementing, and so forth) are growing steadily (from 586 to 727 in 1984). Miscellaneous tool handling grew from 100 to 271. Also general work handling increased (from 702 to 920). According to Dr Schweizer, in this area alone palletizing has already reached a scale requiring a special listing, such as for example in the application case of machine tools (here its use for loading and unloading rose from 320 to 466).

But not even in the future will there be a universal robot for all applications. What is required is much research effort still in order to further all the special applications. Although there were 80 robots in FRG research laboratories as early as in the previous year, at the 84/85 turn of the year there were already 157--of which there were 25 in the IPA alone.

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FACTORY AUTOMATION

PHILIPS OF NETHERLANDS COMPETES IN NUMERICAL CONTROLS

Paris L'USINE NOUVELLE in French 14 Feb 85 p 33

[Article by Antoine Schoen: "Numerical Control: Philips Wants to Live"]

[Text] Well-established in this sector and in a good position to take advantage of the market growth, Philips is expecting to reach 5,000 units per year through a policy of cooperation with machine-tool manufacturers.

Disinformation! There is no other word to qualify the information published by the Japanese company Fanuc, announcing Philips' withdrawal from the numerical control market. Certainly, with a 1984 production of 3,000 units, the Dutch group is like David facing Goliath, i.e. Fanuc, world leader with a production of close to 30,000 cabinets. However, Philips is well established in the sector of numerical controls for stock-removing machines.

"We now hold 15 percent of the European market and expect to see our activity progress by 50 percent in 1985, for the second year in a row. With such results, we have no intention of giving up this branch," Marc Thibord, in charge of numerical-control products for France at Philips, exclaimed.

Indeed, the Dutch group is in a good position to take advantage of the steady growth of the numerical-control market. Europe consumed 15,000 numerical controls in 1984, and should buy nearly three times as many in 1990. In the battle around this promising product, the leading European electronics company has the benefit of a major asset.

"Thanks to research synergism between the numerical control department and the Philips organization as a whole, we can minimize our development expenditures in electronics. Our volume of 5,000 units per year is determined mainly by the amortization of software cost," Marc Thibord explained.

To reach this threshold, Philips is counting on a policy of cooperation with machine-tool manufacturers. A strategy that offers a dual advantage. First, because it creates a market that is temporarily captive. Thus, in 1981, the Dutch group signed a contract with Maho for the delivery of 5,000 units over 5 years. Last year, it also signed an agreement with Oerlikon, another

German manufacturer (70 percent of Philips' numerical control production is sold in the FRG), to which it will supply 2,000 numerical controls over 3 years.

Then, this cooperation offers another interest. It gives to Philips an accurate knowledge of the numerical control market, enabling it to position its products right. The group thus included in its product line systems with five or six axes (which are expected to be sold this year). "We observed that our desire not to exceed four axes had closed many doors to us. In particular with machine-tool manufacturers that wished to use numerical controls of a single brand on their high-end and low-end machines," Marc Thibord explained.

New Products Sold Already This Year

Simultaneously, Philips has oriented itself toward numerical controls that are easy to program. Providing them with several simplifications: graphics option making it possible to display machining cycles; no dual-function keys but instead "soft keys" whose variable functions are displayed on the screen; library of materials indicating the various cutting configurations, etc.

Several products of this new line should be marketed this year. For milling, availability of the graphics option and six simultaneous axes. And above all, conversion of numerical controls to direct numerical controls (DNC).

This new generation is evidence of our determination to be represented on the market of the factory of the future. Then, data will no longer be stored in the control itself, but in a central data-processing system that will manage machining through a microcomputer coupled with the direct numerical control, a Philips P3100 for instance!" Marc Thibord concluded.

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FACTORY AUTOMATION

BRIEFS

ELSAG CONTRACT WITH U.S. FIRM--Milan (VWD [United Economic Services])--In Genoa, a consortium of firms for the development of industrial robot systems has been established between the U.S. concern IBM and the state-owned Italian electronics company Eltag. This specific-purpose association represents the first step toward the founding--scheduled for the end of 1985--of the joint-venture production firm in which IBM will have a 49-percent interest and the Italian partner will be 51-percent involved. The consortium will concern itself above all with working out software systems. The planned production company likewise has its headquarters in Genoa and will reach its full capacity by 1989. IBM and Eltag want to jointly develop and build assembly and production robots, which are to be marketed worldwide. According to firm spokesmen, the company is also open to other Italian firms in this industry. [Text] [Munich COMPUTERWOCHE in German 7 Dec 84 p 1] 12114

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MICROELECTRONICS

OVERVIEW OF FUNDS, FIRMS, PROJECTS FOR ESPRIT IN 1985

Paris ELECTRONIQUE ACTUALITES in French 1 Feb 85 pp 1, 2

[Article by F. Grosvalet]

[Text] Brussels--Encouraged by the results obtained during the first year of operation of the Esprit program, which, it is recalled, was designed to foster transnational cooperation within the EEC [European Economic Community] and to enable the European information-processing technologies industry to become and remain competitive on a world scale in the years to come, the Brussels heads of the program have just announced the work program for 1985 and decided to commit 215 MECU [million European counting units] (around 1.5 MdF [billion francs]) to the program for the current year (on condition that the EEC budget is definitely passed in June as now projected).

At the conclusion of the initial request for bids, launched in March 1984, 104 projects were chosen for EEC financing totaling 180 MECU. The 215 MECU released today are earmarked to finance 50 to 100 additional projects covering all of the five sectors chosen for Esprit. The EEC's share represents only 50 percent of the funding of Esprit; altogether, therefore, 430 MECU are to be appropriated for it this year.

A special effort is to be made this year in the domain of software technology (assuming there are sufficient bidders)--a field that was somewhat forgotten during the initial year for lack of bids. For 1985, bidding will be definitely closed on 25 March, and the first contracts are to be signed beginning in August. The selection of projects this year will take into account their industrial end-use, and the Esprit management will give priority of choice to those projects with the best outlook for the fastest possible realization of functional prototypes.

An additional sum of 215 MECU is to be committed in 1986 to cover new pilot projects and, if necessary, to fund the continuation of the pilot projects and of those projects launched in 1984. The fact is that, although the projects chosen have work programs covering 5 years, the EEC's commitment covers no more than a maximum initial segment of 3 years. The work done on each project is evaluated every 2 years to determine whether the project should be modified, continued without change, or abandoned. Many factors

can affect the course of the project (in particular, there can be, in the course of subsequent bidding, a proposal submitted that is more attuned to the reality of the moment). Of the 36 pilot projects adopted in 1983, 3 were abandoned, 9 underwent major modifications and were subjected to new bidding in 1984, and 24 have been continued without change and integrated into Phase 1 of Esprit. With 610 MECU committed during the first 3 years, not much will be left in 1987 and 1988 with which to launch new projects (considering that the EEC's share for the first phase amounts to 750 MECU); however, the aim was to get as much of the work as possible under way during the beginning of the period.

104 Projects Already Launched

Of the 441 proposals received by the EEC in response to the initial request for bids, it finally settled on 104 projects, based on the following criteria: Quality and innovation, potential for industrialization and exploitation, and competitiveness of the industry. Of the 104 projects, 70 percent were Type A, that is, long-term systems-oriented; and 30 percent were Type B, more ideas-oriented in support of the first. All were funded to the extent of 50 percent by the EEC. France is present in 64 of them (Great Britain in 67, and FRG in 70), led by Bull (sharing in 19 projects), Thomson (16), and CNET [National Center for Telecommunications Studies] (7). Among the other French firms and universities participating in Esprit we might cite: MATRA [Mechanics, Aviation and Traction Company], LETI [Electronics and Technology Laboratory, Grenoble], IMAG [expansion unknown], Marcoussis Laboratories, Renault, CSEE [Signals and Electrical Enterprises Company], and CIT-Alcatel.

In all, the 104 projects--on which more than 500 persons have already begun or are about to begin working (this figure will be 1,000 by year-end 1985 and 2,000 by year-end 1986), thus averaging 5 persons per project--represent the involvement of more than 270 firms, institutes and universities (universities and research institutes participate in 75 percent of them, PME's [Small- and Medium-Sized Enterprise(s)] in 50 percent, and other enterprises in 70 percent), with only 9 participations by subsidiaries of multinationals established within the EEC (IBM, ITT and DEC in particular).

Of the 104 projects, 28 deal with advanced microelectronics (we will discuss these in more detail in our section on components); 14 with software technology, 20 with advanced information processing, 23 with office automation, and 19 with CIM [computer-integrated manufacturing]). Funding is distributed in approximately the same proportions for the first year (26 percent for microelectronics, 14 percent for software, 20 percent for systems architecture, 22 percent for office automation, and 18 percent for CIM), while Esprit's objective is to achieve a distribution of 23, 20, 23, 20 and 14 percent respectively for the five sectors. This explains why a larger proportion has been allocated to the software domain this year, with a redefinition of the work program aimed at clarifying it.

Although it will be a little while yet before the technological fallouts can be measured, some interesting results have already been obtained. In this regard, Brussels has cited: The demonstration of the design of a processor for the digital processing of a signal, based on a silicon compiler developed by BTM [expansion unknown], Philips, Siemens, Silvar Lisco and others; the disclosure of a patent under the advanced interconnection microelectronics project, involving Plessey, AEG and Thomson; and the definition of a set of preliminary design rules for systems architectures used in CIM (completed project).

The Esprit management also emphasizes the circulation of information and is especially proud of the operation of Eurokom, a communications network enabling 450 users to exchange information on Esprit projects. It should be remembered that the sharing of information is a fundamental factor in the European program for the development of pre-competitive research.

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MICROELECTRONICS

PHILIPS, OTHERS PROPOSE 390 PROJECTS FOR SECOND ESPRIT ROUND

Rotterdam NRC HANDELSBLAD in Dutch 3 Apr 85 p 9

[Article by Dick Wittenberg: "Dozens of Projects Submitted: Philips Active in Second Round of Esprit"]

[Text] Eindhoven, 3 April--Some 390 project proposals have been submitted for the second round of Esprit, the European strategic program for research in the area of information technology. Several dozen of them originate from Philips. This time, the Dutch company has announced primarily small projects.

Attention will first be paid to which proposals do not meet the criteria earlier set by the European Community. The remaining projects will be judged according to their significance to technological progress. The spokesman for the European Community expects that it will be possible to make a decision before the summer vacation. After that it will be months before the chosen projects can be made public because the contracts between the parties that are to cooperate in the research must first be completed.

1.9 Billion

Approximately 1.9 billion guilders are available for the second round of Esprit; the same amount can be spent as in the first installment. The European Community accounts for half of this amount. Trade and industry make up the difference in money allocation.

Last year a total of 441 project proposals were submitted. Of these, 104 were approved by the European Community. Philips is involved with 17 of these projects: 11 large research projects, 4 small ones and 2 test projects. In this research, the company is cooperating with some 50 different partners. Philips is investing a total of approximately 80 million guilders in the projects. Between 80 and 120 Philips scientists are participating in the research. Approximately half are working in the Netherlands.

In three projects, Philips is serving as main contractor. Together with Siemens, the Dutch company is working on combining different types of transistors on one chip. A second project is focusing on unconventional computer

structures. A third research effort should result in an improvement in the efficiency and quality of software for industry.

Besides Philips, three other Dutch companies qualified for participation in the first round of Esprit: Oce-Van der Grinten, the Utrecht software firm BSO and Crossware from North Holland. In addition, several universities and academic institutions are cooperating on Esprit projects. The goal of Esprit is to eliminate the European lag in information technology with respect to Japan and the United States. The program consists of five areas of vital importance to information technology: advanced microelectronics, software technology, advanced information manipulation, office automation and computer-aided production.

12271

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MICROELECTRONICS

SOI, SUBMICRON MOS STUDIED BY FRANCE, FRG, ITALY, UK, FOR ESPRIT

Paris ELECTRONIQUE ACTUALITES in French 1 Feb 85 p 15

[Article by F. Grosvalet]

[Excerpts] In advanced microelectronics, French firms, universities and research laboratories are well-positioned in the European program Esprit, in that they are present in 18 of the 28 approved projects issuing from the 1984 RFB [request(s) for bids], and actually manage as many as 6 of them (3 being managed by Thomson-SC [Thomson-Semiconductors], 2 by CNET [National Center for Telecommunications Studies], and 1 by CSEE [Signals and Electrical Enterprises Company]).

In this article, we shall give briefly the designations and objectives of the principal projects presently under way (whether they were approved in 1984 or under the pilot phase of the program); in each case, management responsibility for the project is assigned to the first-named participant. We will report further on some of these in one of our forthcoming issues.

Two Type A projects have been adopted in the domain of submicron MOS technology. The first, "SOI [silicon on insulator] Processing and Materials for 3-Dimensional Integration" (Thomson-CSF [Thomson-General Wireless Company], CNET, GEC [General Electric Company (British)], LETI [Electronics and Data Processing Technology Laboratory, Grenoble], Cambridge University and Cork College University), has as its objective the study and development of new silicon technologies for 3-dimensional integration.

Three principal stages are contemplated:

--Growth of SOI active layers having the electronic properties necessary for the design and construction of high-quality devices and circuits;

--Stacking of two active layers;

--Processing of a single SOI level for the fabrication of individual components and their connection; development of a complete process incorporating two active layers.

The "Submicron MOS Technology" project (CNET, British Telecom, CII-HB [International Data Processing Company-Honeywell Bull], IMEC [expansion unknown], MATRA [Mechanics, Aviation and Traction Company], SGS [General Semiconductor Company], and Catholic University of Louvain) seeks to develop the basic building blocks necessary for the setting up of a 0.5-micron CMOS technology for very fast digital circuits, with an intermediate 1-micron stage. By the end of the project, whose duration is expected to be 5 years, the participating firms are expected to have this 0.5-micron CMOS technology in a pilot production stage.

In connection with these two projects, a Type B project has also been launched, designated "Physico-Chemical Characterization of the Silicon Oxynitrides in Relation to Their Electronic Properties" (University of Utrecht, Aere Harwell, IMEC, MATRA, Philips). Work under this project should make it possible to establish a relationship among the physico-chemical and electronic properties and the growth parameters of these materials, with a view to their use in IC's [integrated circuit(s)], such as MNOS non-volatile memories and submicron MOS devices.

In the domain of submicron bipolar technology, two Type A projects have just been launched. The first, managed by Thomson-CSF, with AEG Telefunken and Plessey, is aimed at the development, within the next 5 years, of a complete submicron bipolar technique, with the design and construction of a test circuit targeted for the end of this period.

The studies will be carried out by Siemens and RTC [Radio Technology-Compelec] and will also be aimed at developing a complete process for the design and construction of very fast data processing circuits (propagation delay of less than 100 psec [picoseconds], merit factor less than 0.1 pJ [pico-Joule], with demonstration using a 10,000-gate, less-than-100 psec-per-gate, ULA [uncommitted logic array].

CAD for GaAs IC's

In the domain of CAD [computer-aided design] for VLSI [very-large-scale integration], only one new project was adopted in 1984, designated "High-Efficiency, High-Reliability ULSI [ultra-large-scale integration] System" (EFCIS [Special-Purpose Integrated Circuits Design and Manufacturing Company], British Telecom, CII-HB, Cirrus Computer, IMAG [expansion unknown], LETI, Tech Hochschule Darmstadt, University of Brunel), the aim of which is the design and construction, through the use of redundancy, of ULSI IC's offering high production yields. In addition, the six pilot projects approved in 1983 (see ELECTRONIQUE ACTUALITES of 16 March 1984) will continue; one of them has already resulted in the development of a silicon compiler that has enabled the design and construction of a signal digital processing IC.

Three projects have also been adopted in the domain of III-V composite semiconductors, two on the technology and the third on CAD for analog GaAs IC's.

The first, managed by GEC, with Bell Telephone Manufacturing, CNET, Farran Technology, Metallurgie Hobokenoverpel and STL [expansion unknown], has as its objective the development of GaAs IC technology using MESFET's, HEMT/TEGFET's and heterojunction bipolar transistors as active elements, configured to demonstrate its advantages as compared to silicon, with respect to speed and power consumption.

The second, managed by Plessey, with Philips, Siemens and Thomson-CSF, will evaluate, using a demonstration digital IC, the performances of the different GaAs logics; the fabrication of an IC is considered by the participants to be non-precompetitive.

The third, in connection with the above two and designated "Development of CAD Methods for GaAs IC's" (Telettra, CISE [expansion unknown], Politec of Torino, Siemens), is aimed at the development of a complete library of theoretical models and experimental data on passive elements and active components for the design of analog GaAs IC's.

In optoelectronics, three projects have just been launched. The first, "Integrated Optoelectronics Based on Indium Phosphide [InP]" (CSELT [Center for Telecommunications Computer Studies (Italy)], AEG Telefunken, British Telecom, CNET, GEC, Heinrich Hertz, Marcoussis Laboratories, Standard Electric Lorenz AG, Standard Telecom and Cables, Thomson-CSF), seeks to develop, within 5 years, very-high-speed fiber-optic transmission systems based on the use of InP, from both the technological and circuit-design standpoints.

The other two are designated, respectively: "Optical Interconnection for VLSI and Very Fast IC's" (GEC, Southampton, and Telettra) the aim of which is to reduce the number of pins and electromagnetic interferences in VLSI's and fast IC's; and "Development of Nonlinear Optical and Electrooptical Organic Materials for the Design and Construction of Devices Using Nonlinear Optical and Electrooptical Effects" (CNET, ICI [Imperial Chemicals Ltd] PLC [expansion unknown], Thomson-CSF, University of Namur).

In the visual display domain, AEG Telefunken, CNET and CSEE will cooperate in the development of materials and technologies for thin-film transistors, enabling the integration of line and column control circuits, for example, on to the liquid-crystal-display substrate.

Twelve other research projects, covering one or more aspects of microelectronics and providing support of the above-cited projects, have also been adopted under the 1984 work program. In this regard we cite: The development of a mixed CMOS bipolar technology (Philips, Siemens); application of the epitaxial layer to silicon by means of molecular jets (CSEE, AEG Telefunken, GEC); study of semiconductor structures in which the carriers are controlled by electrical fields created by implanted or diffused zones (GEC, Thomson-CSF); fabrication of epitaxied CMOS substrates 100 mm and 150 mm in diameter (SGS, IMEC, MATRA); and development of a high-resolution, reactive plasma gravure technique (Fraunhofer Institute, Harwell, Johnson Matthey Chemical Plasma Technology, Technics Europe).

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MICROELECTRONICS

NEW LETI FACILITIES IN FRANCE FOCUS ON MOS, INFRARED IC'S

Paris ELECTRONIQUE ACTUALITES in French 1 Feb 85 pp 1, 18

[Article by J.P. Della Mussia: "The Microelectronics Center of the LETI Is Operational"]

[Excerpts] Grenoble--On 23 January, the president of the French Republic officially inaugurated the microelectronics center of the LETI [Electronics and Data-Processing Technology Laboratory] of Grenoble, which was placed in service one year ago. This step, somewhat unusual in our field (most organizations are glad if they can get a minister to attend an inauguration), is warranted, according to the president, by the fact that the opening of this research center by the LETI is showing "the way to success" and has therefore the value of an example.

The buildings as a whole, with their specific installations, required an investment of FF 110 million. As for the equipment of the center (which has not been completed yet), it will cost FF 170 million in all. Note that the operation of the microelectronics program will require FF 120 million per year (including joint LETI/Thomson research which accounts for FF 90 million, 20 percent of which will be provided by Thomson, 35 percent by the CEA [Atomic Energy Commission] and 45 percent by the government).

These figures can be compared with the annual LETI budget: FF 375 million for 1985. The LETI will employ 160 people on microelectronics, including 110 under the LETI/Thomson agreement that will also drain permanently 30 Thomson employees (which means that 140 people are going to work on this research program, which is quite a lot).

As is known, all in all, the LETI employs 620 people, 325 of whom are working on components. Its resources are provided 51 percent by the CEA, 34 percent by various administrations and 15 percent by the industry. Among the administrations, the armies (DGA [General Directorate of Armament]) are making the largest contribution (close to 50 percent), followed by the DIELI [Directorate of Electronics and Data-Processing Industry] (close to

25 percent), the Ministry of Research and Technology (about 14 percent) and telecommunications (DGT [General Directorate of Telecommunications]) (about 13 percent).

A Remarkable Accomplishment

The microelectronics center of the LETI is obviously a remarkable accomplishment with respect to both the layout of the buildings and the means used.

It covers 17,000 m² on three levels, including 1,600 m² of white rooms. These white rooms, located in two wings, are surrounded by a normal outer hallway and an inner hallway reserved for agents in white coats. The outer hallway is used not only as a passage for visitors and maintenance personnel, but also for the thermal insulation of the white rooms, fluid supply systems, access to machines, and ancillary pieces of equipment. Depending on the location, the cleanliness class is 1,000, 100 or 10.

Among the machines installed for basic research and in particular technological workshops (the prototype workshop covered by the agreement with Thomson is now being assembled), we should mention a Philips electronic masker, two photorepeaters (one Sensor and one GCA [expansion unknown]), one Extrion implanter (two more are expected) and several CIT-Alcatel dry-etching machines. Three Calma circuit-design stations complete the equipment. Obviously, all this equipment will make it possible to develop not only submicron technologies (for integrated circuits, bubble memories, magnetic recording, etc.) but also, in collaboration with manufacturers, machines that will improve the performance of the components now under development.

Priority to Innovation

The LETI is not doing research just on integrated circuits, but on all circuits, such as bubble memories and magnetic heads for instance. A certain synergism could therefore generate ideas. In addition, the LETI does not just develop circuits: it does not hesitate to create or modify production machines in order to improve their performance. (The most important machine programs, in the field of microelectronics, are now being developed with CIT-Alcatel for dry etching, Semy Engineering for ovens and PCVD [Plasma-activated chemical vapor deposition] technology, Microcontrol for future photorepeaters.

The second difference between what can be seen at the LETI and in the industry has to do with equipment: as we saw, the LETI is developing equipment and there is no doubt that these operations are of considerable interest. However, since it has at least contributed to the design of some of the equipment it owns, it will naturally tend not to buy it anymore on the market. There is an incipient danger in this: considering the limited means of the LETI, the probability is small that, systematically and in all cases, the equipment thus developed will be universal and the best in the world; but if you do not have the most advanced machines on the market, you cannot expect to produce the most advanced circuits. Also, if it is a good thing to develop some equipment, it is still better to compare it with very advanced outside equipment in order to progress.

Of course, there is a cost problem that slows down the most eager efforts. But we cannot help thinking that test benches for the various machines on the market would be quite useful to manufacturers, most of which are unaware of the problems awaiting them. (Because of this cost problem, such "test bench" operations would be possible only on a European scale.)

This center is different from similar centers in the industry in one last respect: all the Grenoble facilities are deserted already at 5 pm. Obviously, you cannot expect researchers to work between midnight and 6 am, but if there were two shifts per day, plus a third shift for routine operations on very expensive machines (such as the electronic masker), the investment of the LETI in this center would be worth not FF 280 million, but the equivalent of FF 560 million... At any rate, the equipment acquired will be obsolete in three to four years. Would it not deserve more than a few hours of use per day?

New LETI Priorities: Infrared Circuits and Magnetic Recording

In the allocution he made at the inauguration of the microelectronics center, Mr Jacques Lacour, director of the LETI, recalled the breakdown of the operations of this laboratory and announced (without detailed comments) new offensives to be made on infrared circuits and magnetic heads.

(...) "Among the fields of application of the basic microelectronic technologies that represent most of the LETI's own program, we can mention:

- integrated MOS [metal-oxide semiconductor] circuits (...);
- integrated infrared circuits geared in particular to military applications and for which SAT [Telecommunications Company], Thomson and the CEA are planning to create a subsidiary in the very near future, to serve the large European markets;
- bubble memories (...);
- integrated reading heads for magnetic recordings, a very ambitious project that we are launching with the aid of the government and in collaboration with Bull;
- machines to produce integrated circuits: a vital field in which several French manufacturers, such as CIT-Alcatel, OSL [Scientific and Laboratory Equipment Company], Semy, Microcontrol, etc., are beginning to experience appreciable success on export markets."

"Finally, we should mention other fields such as sensors, complex display screens, that are also calling on our basic knowledge of microelectronics."

In his conclusion, Mr Lacour stated:

"Mr President, during your 1983 visit to California, you had the occasion to visit, among others, the microelectronics centers of the Stanford and Berkeley

Universities, which are among the best in the world. I know personally the heads and researchers of these great teams and I can tell you with confidence that we can now bear comparison with them, with respect to the quality of our men and the means at their disposal as well as with respect to our programs and the results achieved."

"Undoubtedly, the new facilities you just inaugurated will enable us to keep up in the future with our U.S. and Japanese competitors in the field which is ours, that of applied research."

"The relation between the large centers I mentioned above and the U.S. industry is much looser than the relation of the LETI with the French industry. This very close relation, which makes it possible to bring men together, to pool resources, is based on confidence. (...)"

"We must make sure that we do not underestimate the financial means required to pursue consistently our efforts in order to reach our goals."

The LETI's "Infrared" Activity

In 1978, the General Delegation to Armament asked the CEA to create a laboratory to research infrared sensing at the LETI, because of the latter's expertise.

The goal was to develop the technologies required to obtain increasingly complex components for the detection of complete images in the optical windows with wavelengths ranging from 3 to 12 microns.

The goal of this laboratory, located upstream from French companies, is now to ensure the transfer of knowhow to manufacturers selected by joint agreement. It employs about 100 people, has appropriate premises of 4,500 m², and is supported by all of the LETI's expertise in the field of microelectronic technologies.

The successes obtained as early as 1982 have led to the installation of a pre-industrial pilot plant. In 1984, the LETI provided complete sensors in the form of strips or mosaics, meeting the required specifications and making it possible to put French military equipment in a favorable position to bid for several European contracts.

A project to create a specialized company jointly with SAT and Thomson is therefore about to be started, in order to meet the emerging demand and provide a structure of international level.

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CSO:3698/414

MICROELECTRONICS

THOMSON SUBSIDIARY MAKES PROFITS IN PASSIVE COMPONENTS

Paris ELECTRONIQUE ACTUALITES in French 8 Feb 85 p 19

[Article by J.P. Della Mussia: "Thomson-CSF's Passive Components Profitable Again"]

[Text] The passive-components operation of Thomson Components has become profitable again. Indeed, LCC [expansion unknown] got out of the red in 1984, with sales of the order of FF 1 billion (including foreign subsidiaries), an increase of 22 percent compared with 1983.

As for CEPE [Electronics and Piezoelectricity Company], it should make profits starting in 1985, as its 1984 sales rose by 18 percent, to about FF 180 million. Finally, Thomson Components divested itself of its printed-circuit operation, which showed a deficit.

In 1984, for all the products that it classifies as passive components (actually anything that is not exclusively semiconductors, including hybrids and microwave components), Thomson achieved sales of the order of FF 2 billion.

The most spectacular results were achieved by LCC. The 22-percent increase in its sales actually reflects both the fact that unprofitable capacitor lines were taken out of production and the fact that spectacular breakthroughs were made in sales of ceramic and film multilayer capacitors:

- 1984 export sales of multilayer ceramic capacitors were multiplied by three;
- LCC is now exporting 85 percent of its production of film multilayer capacitors;
- exports now account for 52 percent of LCC's sales instead of 45 percent.

Currently, for total Socapex + LCC + CEPE sales of the order of \$150 million, Socapex accounts for 25 percent, the Cofelec soft-ferrite department of LCC

for 13 percent, the LCC package operation for 7 percent, and tantalum and multilayer capacitors for 41 percent (LCC) and 14 percent (CEPE).

As far as LCC capacitors are concerned, ceramic multilayer capacitors represent the largest share, about 50 percent greater than that of film multilayer capacitors and 3 times greater than the share of tantalum.

Investments Twice as High as Its Competitors'

The growth of capacitor sales is the result of several factors, including the rate of the dollar which allows for great competitiveness, in particular in the United States, relative investments twice as high as those of the rest of the sector (FF 100 million in 1984 for LCC), government support to the R&D program, and production rationalization. Indeed, in France, LCC is now concentrating its capacitor operation on film multilayer, ceramic multilayer and power capacitors (non-linear resistors and certain professional products, however, are still the responsibility of LCC France). As for the Spanish factory, it will increasingly specialize in tantalum capacitors. Moreover, the Brazilian factory will increase its production of multilayer ceramics and develop products for the local market. Finally, the Moroccan factory will continue its assembly operation.

As far as film and ceramic multilayer capacitors are concerned, LCC is quite ambitious since it intends to multiply its production by six in four years (by the end of 1988).

According to the development plan, the company would reach a capacity of 600 million of film multilayer capacitors per year and would increase its share of the world market in this field from 8-10 percent to 30 percent. New products will be added to the product lines; in particular, modules are being designed.

For ceramic multilayer capacitors, the goal is to increase the production capacity to over 1 billion parts per year by 1987. LCC also intends to become the European leader already in 1985. Technology will advance with the adoption of economical electrode materials, the general use of a nickel barrier for outputs, and a strengthening of the present automation program. LCC is also considering specific solutions for component insertion.

As far as tantalum capacitors are concerned, the goal is to reach a capacity of 200 million parts per year in 1988 and increase the company's share of the world market from 1 to 3 percent. This program has the support of the Spanish government. Besides, the Spanish factory is now going to do some R&D, and it will also produce radial-output molded tantalum capacitors and tantalum modules.

The Brazilian factories are expected to increase their production capacity for ceramic single-layer capacitors to 1 billion parts per year by 1987.

Toward 10 Percent of the Soft-Ferrite Market?

Ambitions are in no way less as far as the soft ferrites of the Cofelec department are concerned: LCC wants to increase its share of the world market from 7 percent in 1984 to 10 percent in 1988, through an annual growth of 20 percent on a market which is growing at the rate of 5 percent per year. In 1984, its export sales reached 46 percent (20 percent in the United States). As in the case of capacitors, there will be a concentration of efforts on certain ferrites, in particular for power-supplies and TV sets (in particular deflector coils). Cofelec is now devoting 10 percent of its sales to production automation. The company is also adopting a curing process that is three times faster than formerly, so that it is possible to reduce manufacturing times and the time required to adapt production to the demand.

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MICROELECTRONICS

BRIEFS

FRENCH ELECTRONICS 1985 FUNDS--The government has decided to allocate FF 2.75 billion to nationalized companies in the electronics sector, as capital contributions for 1985. This amount, to be provided by the Post and Telecommunications Administration, exceeds the amount allocated last year by FF 450 million. The breakdown of 1985 capital contributions is as follows: FF 1.3 billion for the Thomson group (compared with 1 billion in 1984), 1 billion for Bull (same amount as in 1984) and FF 450 million for CGCT [General Telephone Engineering Company] (compared with FF 300 million). Note that, this year again, CGE [General Electricity Company], the only nationalized company in the electronics sector to have positive results, will not receive any capital contribution. However, we should point out that the group indirectly benefited from state funds on two occasions last year: first, when FF 700 million were paid for an interest in Thomson-Telecommunications, and a second time when it acquired an interest in LTT [Telegraph and Telephone Lines Company] for FF 125 million. [Text] [Paris ELECTRONIQUE ACTUALITES in French 8 Feb 85 p 2] 9294

FRENCH MILITARY INFRARED COMPONENTS--The LETI [Electronics and Data-Processing Technology Laboratory, Grenoble] is planning to create a subsidiary to market military electronic components for infrared detection during the first half of 1985. Mr Jacques Lacour, head of the LETI, made this announcement on the occasion of the inauguration of the new LETI microelectronics center by the president of the Republic, and he indicated that this subsidiary would be owned jointly with SAT (Telecommunications Company), Thomson and the Atomic Energy Commission and would "serve large European military markets." These components, which make it possible to detect images in the infrared range, were supplied by the LETI in pre-industrial series already in 1984 and could put French equipment manufacturers in a good position to bid for military equipment contracts. [Text] [Paris AFP SCIENCES in French 24 Jan 85 p 34] 9294

FRANCE'S CNRS 1985 BUDGET--The 1985 budget of the CNRS [National Center for Scientific Research], amounting to FF 8.3 billion (+8.2 percent compared with 1984), provides in particular for increased efforts in the field of industrial implementation (+25.6 percent with FF 42 million) and also in favor of the Department of Physical Sciences for the Engineer (SPI), a department which, as is known, specializes among other things in electronics and data processing. This year, the number of research jobs created at the SPI--+6.6 percent, i.e. 54 new jobs--will be "well above the average," the CNRS pointed out. Also note that, under the 1984-1988 CNRS master-plan for data processing, credits will increase by 37.4 percent this year. The main new operations for 1985 include the acquisition of a vectorial processor and the startup of networking and message-routing operations, the center also indicated. [Text] [Paris ELECTRONIQUES ACTUALITES in French 18 Jan 85 p 2] 9294

WAFER PRODUCTION IN FINLAND--The two Finnish firms of Outokumpu Oy and Nokia Oy intend to start production of wafers in Finland. Wafers are extremely thin disks (primarily made of silicon today) which serve as a base for electronic chips. Initially, the new facility is expected to produce some 300,000 wafers annually; but this figure will increase to just under one million at a later date. The projected plant is the first of its kind in the Scandinavian countries. It will have a staff of about 70 and is expected to have an annual turnover of approximately 100 million finnmaks (or some DM 50 million). Outokumpu and Nokia believe that their primary wafer markets will be in Scandinavia and the rest of Europe. Outokumpu Oy, a state-owned firm, is Finland's largest mining company which concentrates on copper mining and the production of semi-finished copper products as well as technical products and the production of high-grade steel. Nokia Oy is in the forefront of the development of microcomputers and cash register terminals in Finland. It also builds machinery and via its Salora subsidiary is active in television and communications technology. [Text] [Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 12 Mar 85 p 5] 9478

CSO: 3698/387

SCIENTIFIC AND INDUSTRIAL POLICY

BENEFITS OF TAX REBATE FOR RESEARCH IN FRANCE FOR 1984

Paris INDUSTRIES & TECHNIQUES in French 20 Jan 85 p 31

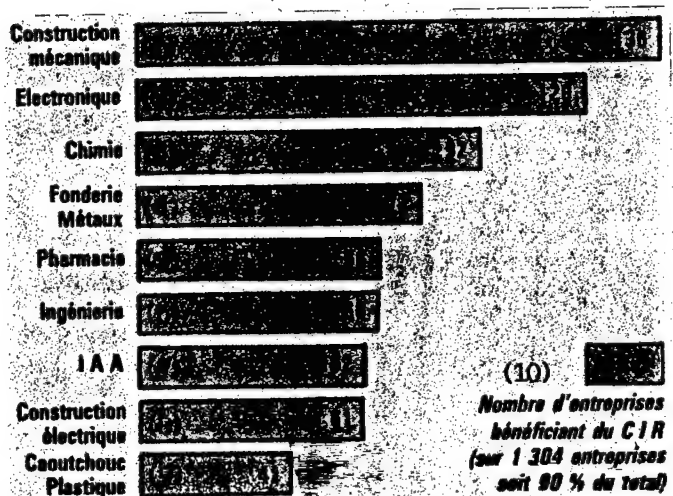
[Text] The time has come to analyze the initial results of the CIR [tax rebate for research] created by the 1983 budget law to encourage enterprises to increase their outlays for research. It will be recalled that this tax rebate, which is deductible from the tax due, amounts to 25 percent of the difference between an enterprise's research expenditures in a given year and those of the preceding year (adjusted, of course, in accordance with the average price index), subject to a ceiling of 3 million francs per enterprise per year.

Offered to all the industrial enterprises, 1,460 of them finally availed themselves of this provision in 1984, for a cumulative total of 357 million francs.

A statistical analysis involving 1,304 of these enterprises (90 percent of the total) yields several interesting findings. First of all, the total volume of their investment in research increased by 12.8 percent, that is, by a substantially higher percentage than the national average.

Secondly, regarding the size of the enterprises benefited, a remarkable phenomenon emerges: Nearly 61 percent of the firms concerned are PMI's [Small- and Medium-Sized Industr(ies)] employing less than 500 salaried persons. Most of them were "ignored" by the national R & D surveys. And, as regards the distribution of the sectors affected by the CIR, all sectors and all regions did not take advantage of this provision in like manner. The most active sectors were: Mechanical construction (10.4 percent of the total number of enterprises concerned), electronics construction (9.2 percent), chemical industry (7.0 percent), and foundries and metalworks (5.9 percent). But this will to invest in research, evidenced by the use of the CIR, must be viewed against the volume of the actual outlay. Thus, although more than 9 percent of the enterprises analyzed belong to the electronics construction sector, the total outlay by this sector represents only 5.5 percent of the sum total, and the average CIR per enterprise is only 0.16 million francs. It is therefore less than the national average of 0.24 million francs per enterprise.

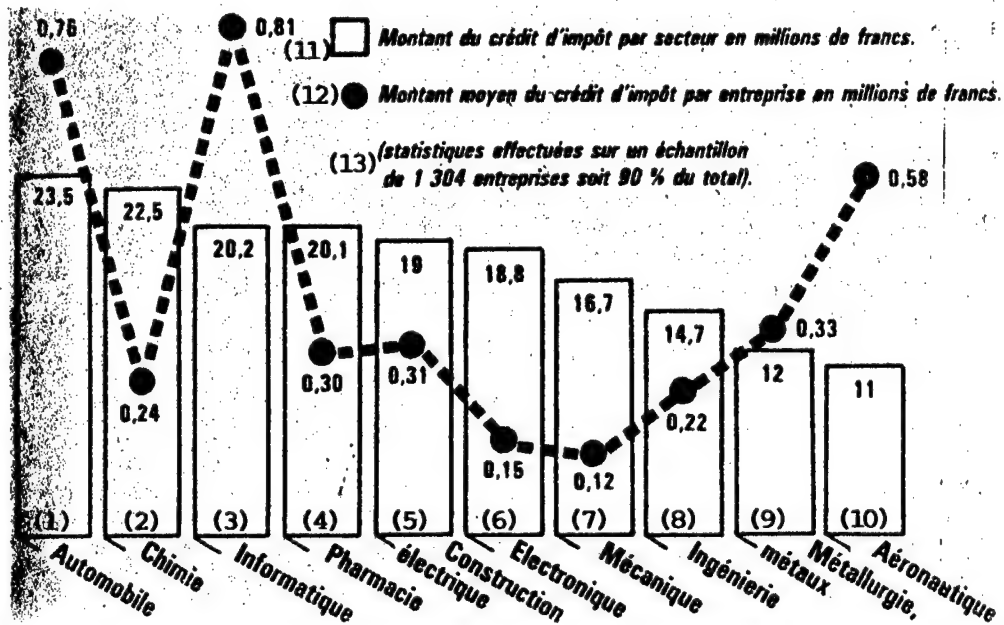
Use of CIR by Sectors



Key:

1. Mechanical construction.
2. Electronics.
3. Chemicals.
4. Foundries and metalworks.
5. Pharmaceuticals.
6. Engineering.
7. Agricultural and Food Industries
8. Electrical construction.
9. Rubber and plastics.
10. Number of enterprises availing themselves of CIR (out of 1,304 enterprises, or 90 percent of the total).

Benefits of CIR by Sectors



Key:

1. Automotive.
2. Chemicals.
3. Data processing.
4. Pharmaceuticals.
5. Electrical construction.
6. Electronics.
7. Mechanics.
8. Engineering.
9. Metalworks and metals.
10. Aeronautics.
11. Total CIR by sector in millions of francs.
12. Average CIR per enterprise in millions of francs.
13. Statistics based on sampling of 1,304 enterprises, or 90 percent of the total.

CIR Provision Extended to 1985

Furthermore, although 60 percent of the firms that availed themselves of the CIR were PME's [Small- and Medium-Sized Business(es)], it was nevertheless in the energy sector, where big firms evolve, that the CIR per enterprise was highest (nearly 1.4 million francs on average). The next best showings were those of the data processing (0.81 million francs) and automotive (0.76 million francs) sectors.

And lastly, there is good news for the industrialists.

The CIR provision, which terminated, in principle, has been reinstated for 1985. All enterprises will be able to avail themselves of this option this year. And for those making their debut in R & D during 1985, the door will remain open until 1986.

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CSO: 3698/382

SCIENTIFIC AND INDUSTRIAL POLICY

ROUNDUP OF FUNDS GRANTED BY FRANCE'S ANVAR IN 1984

Paris AFP SCIENCES in French 24 Jan 85 pp 1-5

[Article: "Scientific Research Policy and Organization; FF 11 Billion in Loans and Subsidies Allocated by ANVAR in 1984"]

[Text] Paris--Some FF 11 billion in subsidies and loans were allocated by ANVAR [National Agency for the Implementation of Research] in 1984, to some 3,000 firms (5,000 if we include the beneficiaries of loan-lease agreements), over 90 percent of which were small or medium-size firms, Mr Christian Marbach, general director of ANVAR, told the press on 21 January.

It is true that close to 10 of the FF 11 billion were allocated in the context of the FIM, the Industrial Modernization Fund, a mission that was given to ANVAR in 1983 and which looked like a veritable challenge at the start, a challenge that has "now been won," according to Mr Marbach.

Yet, we should not forget that, historically and logically, ANVAR's essential mission is to implement research, which is done in several ways: consulting and services, assistance in filing for patents, assistance to laboratory innovation (166 aids granted in 1984, amounting to FF 70.8 million), expert assessment, support to research companies under contract and collective research centers, etc.

More than ever, it was emphasized, ANVAR is providing support to research organizations, to enable them to fulfill the responsibility assigned to them by the LOP [Organization and Programming Law] concerning research implementation.

To do this, ANVAR continued in 1984 its consultations with the general directors of major research organizations, in order to adapt the Agency's services to the implementation policy of the organizations. It developed the tools required to implement research results and ensure an increasing flow of transfers to the industry.

The results of these orientations in 1984 were:

1. New consulting and service agreements with research organizations, which appointed officials responsible for implementation in their new structures;

that was the case, for instance, at IFREMER [expansion unknown] and the INRIA [National Institute of Data-Processing and Automation Research].

2. The mobilization of researchers to implement their results resulted, at the request of the organizations, in consulting services involving 510 new dossiers coming mainly from the CNRS [National Center for Scientific Research], universities and university-level schools, i.e. 45 percent more than in 1983 (see table).

This incoming flow, offset by the monitoring of older results whose prospects for industrial application are no longer promising enough, makes up a total number of 2,056 dossiers on research results, i.e. 17 percent more than in 1983.

Patents taken as a direct results of the policy of constituting a portfolio of the organizations' patents numbered 1,004, including both the new dossiers examined in 1984 and the cases examined in 1983 for which foreign patent applications were filed within the year of priority.

Compared with 1983, the number of patents initially taken in France increased by 67 percent in 1984. In 1984, 131 contracts were signed, including 60 licensing agreements with manufacturers.

3. The Financial Tools of Implementation

Financial intervention through aid to laboratory innovation, which helped finalize results in order to accelerate their transfer to the industry, was continued at the same rate as in 1983.

In 1984, 207 applications for aid were received and, for applications made in 1983 as well as in 1984, ANVAR granted 166 aids amounting to FF 70.8 million, which represents 10 percent of all aid to innovation and 8 percent of the total amount allocated in 1984 (see table).

The cumulative number of aids to laboratory innovation since 1979, representing both the interest of a bet on the technological development of laboratory results for the industry and an opportunity for companies to consider finalized results for product or process applications, amounted to 541, for a total of FF 185.8 million.

The introduction of the Laboratory-Innovation-Detection (DIL) procedure, another form of aid to innovation designed to identify potentialities and results that could lead to possible technology transfers to the industry in the short or intermediate term at the initiative of laboratories [as published]. Through outside assessment, this procedure gives research officials a means to take into consideration the organizations' implementation goals.

The introduction of "technological fees" provides financing enabling companies to have recourse to the services of experts, in particular research scientists, to solve one or several technical problems.

Table 1. Implementation; 1984 Statistics

<u>Organizations</u>	<u>New Dossiers Received in 1984</u>
CNRS and associated laboratories	348
Universities and university-level schools	98
INSERM [National Institute for Health and Medical Research]	11
Other public organizations	53
Total.	510

<u>Category</u>	<u>Patents Taken in 1984</u>
New patent applications filed in 1984.	186
- France	182
- Foreign countries.	4
Applications for foreign patents based on previous year's priorities	818
Total.	1,004

Table 2. Breakdown of Aid Allocated for Laboratory Innovation, by Number and by Organizations

<u>Organizations</u>	<u>1983</u>	<u>1984</u>
CNRS (own laboratories).	10.2%	10.8%
CNRS (associated laboratories and teams)	32.8%	22.8%
Universities	28.5%	26.5%
University-level schools	10.9%	13.2%
Defined-goal research organizations.	4.4%	10.8%
INRA [National Institute for Agronomic Research]	1.5%	5.3%
INSERM	1.5%	1.8%
Technical centers.	5.1%	5.3%
Miscellaneous.	5.1%	3.5%
Total.	100.0%	100.0%

The full impact of the laboratory-innovation-detection and technological-fee procedures should occur in 1985. More specifically, in the context of additional efforts accompanying and promoting the development of industrial research, as decided by the Ministry of Industry and Research on 22 February 1984, the Agency adopted a financial provision to increase its support to Research Companies under Contract (SRC) and Collective Research Centers (CRC).

This aid to innovation takes the form of a subsidy enabling these organizations to improve their competence and explore new scientific and technological fields while encouraging them to step up the transfer of their research results to the industry, through the development of contractual programs with the industry and a consistent strategy with respect to patents.

The results of the implementation of this provision in 1984 can be summarized as follows: the Agency contributed FF 27.3 million to 43 dossiers submitted under this provision, which will be continued in 1985.

The creation of companies based on technology will be a preferred implementation tool of the Agency whenever possible at the request of research organizations. The procedure of aid to company creation is used to that effect and will bear fruit in 1985.

4. Among the incentives to university-company relations and technology transfers, special emphasis was placed in 1984 on the promotion of the implementation of research results, especially through:

- the regional Provence-Alps-Cote d'Azur operation, also called "industry-innovation operation";
- participation to national shows such as the Physics Show, and to regional exhibitions, Aquinov, etc.;
- the organization of technological grants on the occasion of the SITEF [expansion unknown] in Toulouse and the National ANVAR Symposium in Lille, in March 1984;
- MARCHE DE L'INNOVATION which, in its regular "Laboratories" column, describes the technological resources of university research organizations and specialized institutes, from Ajaccio to Valenciennes and from Strasbourg to Toulouse;
- employment-training contracts (CEF) making it possible for companies to hire R&D cadres trained in research. This is done jointly with the B. Gregory Association. In 1984, over 200 contracts were signed.
- the development of Labinfo (expertise of laboratories) by the CNRS and ANVAR, in the context of the Bank of Knowledge and Techniques, was continued (over 5,000 laboratories were listed and can be reached through Telesystems).

Mr Marbach also indicated, more precisely, that in 1984 ANVAR had allocated FF 860 million in aids to innovation to over 1,600 industrial companies, and had examined--and was following up--close to 4,000 dossiers involving 3,000 companies (a number far exceeding the number of industrial companies that stated they were doing some R&D, whose number is estimated at 1,500).

This shows that the concept of innovation is broader than that of R&D...

Mr Marbach indicated that repayment of these aids to innovation will amount to around FF 100 million in 1984 which, considering that repayment was deferred and staggered, would represent an eventual repayment of 40 to 50 percent of the amount of the aids involved. "This rate of success is a very satisfactory goal that should be maintained."

Mr Marbach also announced that in 1985 ANVAR will allocate FF 300-400 million to finance the purchase of microcomputers for schools.

SCIENTIFIC AND INDUSTRIAL POLICY

FRENCH INDUSTRIAL MODERNIZATION FUND GETS FR 9 BILLION FOR 1985

Paris ELECTRONIQUE ACTUALITES in French 25 Jan 85 p 3

[Article by RV]

[Text] The FIM [Industrial Modernization Fund]--the intent of which is primarily to enable enterprises to acquire automated production equipment, for the most part "Made in France"--will get some 9 billion francs in 1985, approximately the same as in 1984. This disclosure was made recently by ANVAR [National Agency for the Implementation of Research] at a press conference on 21 January. A new feature has been added, however: Of these 9 billion francs, 300-400 million francs will go to educational establishments to build up their data processing equipment. We might note, incidentally, that the enterprises of our sector represent roughly, in terms of value, 20 percent of the FIM's PPT's [Technology Participation Loan(s)] and 25 percent of ANVAR's innovational subsidies.

Between 1 September 1983, the date of its coming into being, and 31 December last, the FIM has facilitated the granting of 8.1 billion francs of PPT's to enterprises. These PPT's, it is pointed out, are but one of the FIM's forms of intervention. The equipment bought as a result of these loans--a large part of this equipment consists of data processing and CIM [computer-integrated manufacturing] systems--is to the extent of 66.3 percent French equipment, according to ANVAR. These 8.1 billion francs of PPT's represent industrial investments totaling 18.3 billion francs, comprising 1,040 applications submitted by enterprises.

Mr Christian Marbach, general manager of ANVAR, indicated that the funds being made available to the FIM in 1985 should total "at least 9 billion francs," substantially the same as in 1984.

Of the 8.1 billion francs of PPT's granted up to 31 December 1984, 1.4 billion went to electronics, data processing or office automation firms; 81 million francs to firms specializing in CIM; and 159 million francs to scientific instrumentation firms. Overall, for these three categories of enterprises, this represents 3.1 billion francs of industrial investment programs and 11 percent of the total number of PPT applications, as well as 21 percent of the total value of these loans.

Leasing for EAO [Computer-Aided Teaching]

Mr Marbach also stated that of the FIM's approximately 9 billion francs for 1985, 2 billion--practically the same amount as in 1984--will be distributed in the form of loans to equipment-leasing firms. These leasing loans are intended primarily to enable the installation of modern industrial equipment in enterprises of modest size. They represent 20 percent of the FIM as a whole.

This year, ANVAR will also begin aiding teaching establishments to acquire micro-data-processing equipment under leasing arrangements. Between 300 and 400 million francs will be devoted to this operation this year.

Industrial innovation subsidies--aimed at facilitating the development of new products and processes, filing of patent disclosures, etc--accorded by ANVAR in 1984 totaled 1,246 (including 35 to electrotechnical enterprises; 65 to electronics enterprises; 48 to data processing firms; 51 to measurement and control firms; 15 to laboratory equipment firms; and 24 to automation firms). These subsidies totaled 759 million francs last year, 190 million francs of which went to electronics, data processing, instrumentation, electronics and CIM firms.

Mr Marbach also indicated that his agency will be increasing its grants in aid to laboratories. These grants, intended to facilitate research and development of inventions and industrializable discoveries, numbered around 150 in 1984, and totaled 60 million francs. Most of these grants go to five industrial sectors, including that of electronic and electrical equipment, and that of medical equipment, ANVAR's general manager emphasized.

Mr Marbach further indicated that, beginning this year, ANVAR will distribute another type of loan, designated "medium-term innovation" loans, intended to facilitate the bringing out of new products by enterprises. Between 300 and 500 million francs will be devoted to these new loans through the FIM.

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CSO: 3698/383

COFACE OF FRANCE TO OFFER SERVICE FOR 'RISK COUNTRIES'

Paris L'USINE NOUVELLE in French 25 Apr 85 pp 42-43

[Article by Roselyne de Clapiers: "'Country Risks': A New COFACE Service for Business"]

[Text] In 1984, FF 8.9 billion of indemnities were paid to exporters: the "country risk" remains high! As a result, COFACE [French Foreign Trade Insurance Company] is refining its risk-assessment methods and will provide information to companies.

Something is changing Rue Marbeuf. Apart from the fact that changes are expected to take place in the COFACE management, a "novelty" will surprise the regular customers of the French Foreign Trade Insurance Company, which is usually so discreet. It is determined to start a service to inform exporters about the "country risk."

A small revolution, undoubtedly due to considerations of profitability. In addition, COFACE recognizes that the recent magnification of the debt problems of many developing and East European countries has made the question of the "country risk" commonplace. The IMF [International Monetary Fund] as well as the Club of Paris, which used to be secretive, are now openly mentioning the names of countries whose foreign debts are being rescheduled. Therefore, diplomatically speaking, the subject is not as taboo as it used to be. Because of the magnification of debt problems, the exporter about to sign a large contract or to make an investment abroad must consider not only the future political stability of the country involved, but also--and he must do so systematically since 1982--the financial risks he may be incurring (non-payment).

One figure gives an indication of the danger: in the past two years, the indemnities paid by COFACE on individual "intermediate and long-term" policies have been close to FF 9 billion (8.7 in 1983 and 8.9 in 1984, for which the amounts recovered through refinancing and exchange profits amounted to FF 7.2 billion). It is a huge amount. In 1982, the total was only FF 5.8 billion!

A Sophisticated Internal Data-Processing System Available to All

COFACE covered FF 250 billion in exports in 1984, compared with FF 235 billion the year before! Its role is increasing with world trade and world risks. Since 1983, it has attempted to achieve a more selective risk management, and its research is now being completed through the installation of a sophisticated internal data-processing system--that will be available to the DREE [Directorate of Foreign Economic Relations], the Treasury and its supervising bodies, the Ministry of Finance and Industrial Redeployment and the Ministry of Foreign Trade. According to Yann Delabriere, financial and development director, "this is neither a rating system like that used by certain service companies (Beri, Euromoney, etc.), nor detailed monographs like those supplied by some banks."

In his opinion, it does not make sense to compare marks given to Sierra Leone and Argentina, and monographs are often confusing.

Rather, COFACE, which has at its disposal financial experts and very complete sources of information (in particular through the financial, commercial and political specialists of embassies), is creating a computerized tool that is both synthetic and complete to analyze the "country risk." "We are contemplating marketing a by-product of our internal product by the fourth quarter of 1985," Yann Delabriere indicated. What will he offer? Certainly not sensational or confidential information, but rather three types of data: on the economic progress of the countries, on their financial behavior--legal precautions that should be taken, payment time and conditions, etc.--and finally, if possible, comparisons with the financial operations of European, Japanese or U.S. competitors... This should be quite useful for exporters.

9294

CSO: 3698/412

SCIENTIFIC AND INDUSTRIAL POLICY

TEN FIRMS FORM 'EUROVENTURES' VENTURE CAPITAL COMPANY

Paris TERTIEL in French Feb 85 p 28

[Article by Helene Constanty: "The Common Market of Venture Capital"]

[Text] Another venture-capital fund! But it was just created by 10 of the largest European manufacturers and it will operate in ECUs [European Currency Units].

Euroventures started in January. It is the first specifically European venture-capital fund. It is also the first to operate with a capital of 37 million... ECUs (European Currency Units)! The idea was launched early in 1984, at the "Round Table of European Manufacturers," a "club" gathering 22 of the leading bosses of European industry. Ten of them (and soon 12) picked up the challenge.

The (symbolic) choice of the ECU reflects quite well the motivation of the founders of Euroventures: to promote the development of a truly European industry supported by strong bases in the new technologies. To achieve this, Euroventures will operate a "lever effect": the initial 37 million ECUs will enable it to invest "in fine" 100 million in companies currently being created or with a strong potential for growth in advanced sectors with a European vocation. Indeed, the system provides for the creation of 5 national satellite funds of 25 million ECUs each. About 40 percent of the capital of these funds will be provided by the "parent" fund, Euroventures BV, and the rest by local industrial members and outside investors. Henk Goris, general manager of Euroventures (and formerly financial manager of Philips) has two years to set up these five funds. The Italians were the first to act: at the initiative of Fiat, Pirelli and Olivetti, the first satellite fund will be created already this spring. The Swedish project (Volvo, ASEA [Swedish General Electric Corporation]) should be next, before the end of the year. The French, German and Dutch funds (the latter probably extending to Benelux) would follow.

At the origin of the creation of Euroventures, there were two conclusions of a study ordered by the Europeans from Telesis, a consultant. "The funds raised in Europe through venture capital funds (\$350 million for Europe as a whole in 1984) are markedly below U.S. figures (\$3 billion). In addition," the study concluded, "European venture-capital funds with the best performance have a deplorable tendency to invest their capitals on the other side of the Atlantic."

The main reason mentioned by the latter to justify their attitude: the lack of projects to be financed on the Old Continent.

Now, the members of Euroventures are convinced of the contrary. "Projects do exist, and we know where to find them," they answer. Where? To begin with, within their own companies.

The new fund will enable these firms to promote "swarming," i.e. the departure of one or several cadres ready to launch the creation of a company based on an idea that is not exploited within the existing structure.

Volvo already has a well-defined project: the Swedish manufacturer wants to use the fund to develop and market its "automated carrier system," an automated handling system developed a few years ago at its Kalmar factory.

The 10 Sponsors of Euroventures

With capital supplied by its members, Euroventures will invest in European companies through five satellite funds. The first fund will start in Italy in the spring of 1985.

Table: Euroventures BV (January 1985)

<u>Satellite Fund</u>	<u>Starting Date</u>	<u>Companies</u>
Italian Fund	Spring 1985	Pirelli Fiat Olivetti
Swedish Fund	Late in 1985	Asea Volvo
French Fund	1986	BSN [Boussois-Souchon- Neuvesel] Saint-Gobain Lafarge-Coppee (cement)
German Fund	1986	Robert Bosch
Benelux Fund	1986	Philips (Netherlands)

9294

CSO: 3698/412

SCIENTIFIC AND INDUSTRIAL POLICY

FIVE FRG BANKS INVEST IN REORGANIZED VENTURE CAPITAL FIRM

Landsberg PRODUKTION in German 15 Nov 84 p 28

[Text] With the adoption of the fund concept, the Deutsche Wagnisfinanzierungs-GmbH (WFG), founded by 29 credit institutions in 1975, will follow a new course in the future in providing innovative moderate-sized companies with venture capital. For this purpose, the former WFG is being converted into a pure management company whose shares will now be held by only five institutions - specifically, the Deutsche Bank (30 percent), the Dresdner Bank (22 percent), the Commerzbank (18 percent), the WestLb (18 percent), and the Bayerischen Landesbank (12 percent).

According to statements of Dr Herbert Zapp (Deutsche Bank AG), the new WFG initially will administer the "First Participation Limited Partnership of the WFG", with an anticipated capital of DM 100 million to DM 130 million, of which the five member banks hold DM 80 million as the first fund.

The other partners of the former WFG, as well as foreign partners, can also participate in this limited partnership, intended for a lifetime of approximately 10 years. The fund capital, according to Zapp, is intended to be used for the purchase of minority shares of promising growth companies of moderate size without the purpose of producing profit.

The sectors of information and communication technology, robot, energy, and environmental engineering, and bioengineering and new materials and services in the area of new technologies are mentioned as points of emphasis. In addition, the new WFG also wants to accompany its German member firms in foreign activities. In the long view, private investors should also be interested in the acquisition of shares of the fund.

The former WFG, which starting immediately will take on no more new business, will likewise be treated like a fund, according to Zapp, with no change in the legal form, and will be co-managed by the new management company. The former WFG, as of the end of September 1984, is said to have invested approximately DM 40 million of its DM 50 million capitalization, and to participate with an average of DM 1.2 million in 35 companies.

Considering the usual reserves for refinancing in the venture business, the capital is said to be almost completely invested in this. The shareholders are said to be eight newly founded groups with an investment volume of DM 7.6 million, seven older companies with DM 13million, and 20 young companies with DM 20 million of investment volume.

Of the 35 participants at this time, two companies are said to have gone to the exchange up to now for further financing. The high point of investment of the former WFG was in the 1983/84 fiscal year with 14 new capital commitments that required an investment volume of almost DM 20 million. Of these, eight companies have the legal form of stock corporations that likewise intend to be listed on the exchange after a period of maturing.

The new WFG in the future, it is said, will be operated by the banks as a purely private venture. The risk participation agreement with the Federal Government that exists for the former WFG - this obligation to advance capital has required expenditures of the government since 1975 of a total amount of more than DM 30 million - was terminated as of the end of September, 1984, according to Zapp. In all, the former WFG since then is said to have invested DM 68.5 million in 61 innovative partner companies, of which 15 have been sold and 9 have failed because of bankruptcy or creditor settlements.

12902

CSO: 3698/298

SCIENTIFIC AND INDUSTRIAL POLICY

FRG PREPARES CAPABILITY STUDY FOR PARTICIPATION IN SDI

Frankfurt/Main FRANKFURTER ALLGEMEINE in German 28 Mar 85 p 2

[Article by "fy": "Technological Strengths and Weaknesses in the Federal Republic"]

[Text] Luxembourg, 27 March--It has been announced in Luxembourg that the Federal Government will seek to agree with the other European NATO partners, including France, on a joint reply to the letter handed by U.S. Secretary of Defense Weinberger on Tuesday in Luxembourg to his counterparts assembled there for a meeting of the Nuclear Planning Group. Defense Minister Woerner confirmed in Luxembourg on Wednesday that the Federal Government preferred a joint response by all European NATO states to separate actions. Woerner said it was important that in the discussion in Luxembourg about the U.S. missile defense program it had been possible to perceive a uniform and positive attitude of the European partners. Just as positive, he said, was the fact that the U.S. negotiating position in Geneva had the Europeans' unanimous support.

As early as a day after the U.S. Government had addressed an official request to the Europeans in Luxembourg to participate in the SDI research program and to inform it of their decision within 60 days, it became known in Luxembourg that the Defense Ministry had prepared for this contingency, having conducted investigations as to the research fields in which the Federal Republic was particularly well qualified to make a contribution to SDI and the areas in which its qualifications for such a contribution were particularly poor. A study conducted under the aegis of the head of the Planning Staff in the Defense Ministry, Ruehle, with the participation of 30 leading technological companies and several research institutes, had identified 11 technological fields in what was required for the SDI project, analyzing the respective research and industrial capacity of the Federal Republic in these fields.

In the process it had turned out that the Federal Republic had achieved very good results so far in five of these 11 fields--leading in two of them, even compared with the United States. In the remaining six fields, however, the study noted a great--in some fields, huge--lag. According to the study, the Federal Republic is the undisputed leader in the field of optical sensors and of the subsystems in space technology. It is among the leaders in the fields of high frequency technology and signal processing, system components for extremely fast accelerating high-speed missiles and material technology. This first result is also considered the point of departure for possible cooperation.

From the German point of view it would now be important for the Americans to identify the key technologies and to state what results they expect for the SDI program. Moreover, it is considered necessary to make it clear on a national and bilateral basis whether in the research work one expects results which can also be utilized in civilian industry outside the SDI program. What is to be established in particular is exactly what the Americans mean by participation, what financial consequences this includes and whether it is contemplated for individual scientists to be included in U.S. teams or for entire research teams from the allied states to be involved, and finally what the consequences would be of nonparticipation--that is, a negative response to Weinberger's letter.

8790

CSO: 5200/2537

FRG PROMOTES COMPUTER LITERACY AT SECONDARY SCHOOLS

Duesseldorf VDI NACHRICHTEN in German 4 Jan 85 p 5

[Text] On 7 December in Bonn, a new concerted action for the promotion of leading research and a framework plan for the education of all children and youth in computer literacy was studied by the Federal Government-Laender Commission for Educational Planning and Research Assistance (BLK). Moreover, in a research-policy talk with representatives of the scientific organizations and institutes being assisted jointly by the Federal Government and Laender, some of the topics were the medium-range financial resources of these institutions, difficulties in technology transfer, and assistance to young scientific talent. The representatives of science urged above all that the Laender provide 1 percent more professorships per year for a period of 5 years, so that outstanding junior academics can also obtain permanent situations after the completion of their qualification phase.

Information Engineering in Secondary School I

The framework plan decided on by the Federal Government and Laender for education in computer literacy provides for a basic education for all pupils in secondary school level I. It is to be embedded in the teaching of existing subjects. The danger is recognized that in working with computers the language will become more and more standardized. According to this plan, it is important to avert the danger of a positivism which deliberately excludes meaningful questions. Basic structures of information-handling techniques and their simple application, possibilities for using them and their verification, chances and risks involved in information-handling techniques, the establishment of a rational relationship to them, and problems of personal-identity protection and data protection are to be subjects of instruction already in this first stage. A computer-literacy education which goes even deeper, in the form of computer science, is provided for secondary school II--that is, the upper grades of gymnasium study.

This includes the manner of operation, capabilities, and capability limits of computers, problem-solving methods, programming languages, structured programming and data structures, computer use for calculations, graphics and simulation, and process control by microprocessors. The focal points in that part of computer-literacy education geared to vocational aspects--

which is important to almost all vocational fields--will be computer-aided drawing, plotting, and designing, programming of machines and production runs, and also integrated data processing and word processing. Since there are still not enough teachers for the field of information engineering and since in the next few years it will be possible to engage only a few new teachers, the framework plan emphasizes the importance of continued and additional education for the existing teaching personnel.

Although there is agreement between the Federal Government and Laender on the special program for assisting selected researchers and research groups (leading research), nevertheless the latter want to defray only 25 percent of the total of DM 150 million which is to be authorized within 5 years.

Up to DM 3 Million in a Particular Case

The Federal Government, which has already raised DM 5 million in its 1985 research budget and DM 1 million in the budget of the Ministry for Education and Science, is assuming that there will be a 50-percent participation. Until an agreement is reached, these funds are conditionally frozen. According to the plan, those researchers and research groups can be assisted which have performed work in their field which is fundamental and recognized as especially outstanding. They must be recommended for assistance by third parties. The German Research Association decides on the selection, and to that end it must draw up its own submission conditions. The amount of the assistance must not exceed DM 3 million in any particular case, with this being distributed over a period of 5 years. About ten researchers/research groups per year are to be accommodated.

12114
CSO: 3698/318

SCIENTIFIC AND INDUSTRIAL POLICY

REORGANIZATION AT MINISTRY OF RESEARCH, TECHNOLOGY IN FRANCE

Paris AFP SCIENCES in French 17 Jan 85 pp 7-8

[Article: "Reorganization of the Ministry of Research and Technology"]

[Text] Paris--Since its reconstitution last July, the Ministry of Research and Technology (MRT) has had departments in common with the Ministry of Industrial Redeployment and Foreign Trade, and a reorganization of the central departments of the MRT was necessary. It was just made public by Mr Hubert Curien.

Among the departments common to the MRT and the Ministry of Industrial Redeployment and Foreign Trade are general administration, information and communication, regional and international affairs, and the center for futurology and assessment.

The reform decided by Mr Curien involves the General Directorate of Research and Technology and the Scientific and Technical Mission. It retains the principle of a combination of competence in various fields, as required to implement a national research and technology policy. According to an MRT communique, this reform "rests on the determination to affirm several ideas":

- rationalization of structures, to further enhance the ministry's effectiveness;
- development of the necessary link between research and the industrial and tertiary sector;
- strengthening of the programming function.

As a result, the new organization will be as follows:

1. Scientific and Technical Mission, headed by Mr Robert Chabbal

- the new vice-president, Mr Michel Lavalou, will be specially responsible for industrial research; he will supervise the ministry's scientific and technical resources in the fields of industrial research and technological development. He will have the responsibility of initiating and following up operations directed at companies, for various branches of activity and in the various technologies. He will be assisted by Mr Pagezy.

- the various departments of the Scientific and Technical Mission are classified in three main divisions covering the following fields:

- . sciences and technologies of the physical and living matter (head: Mr Jacques Demaille);
- . sciences and technologies of industrial systems, resources and environments (head: Mr Lavalou);
- . research in the social, economic and cultural fields (head: Mr Garden).

2. General Directorate of Research and Technology, headed by Mr Roland Morin.

It includes:

- The Directorate of Research Organization and Promotion (Director: Mr Jean-Francois Thery) in charge of all structural components of the research and technological development policy (scientific employment; structure of organizations) and of all means and procedures required to implement research and develop technology transfers.
- The Directorate of Research Financing, now headed by Mr Jacques Bravo, director, and covering all budget matters (civilian research and development budget) and financial operations (Research and Technology Fund).
- The programming department headed by Mrs Marie-Therese Claude. This new component will, among other things, provide the programming committee chaired by the minister with the synthesis and consistence elements required to make decisions and choices concerning the orientations and programming of the research and technological development policy.

9294

CSO: 3698/402

FIVE-YEAR SCIENTIFIC, TECHNOLOGICAL PROGRAM SUMMARIZED

Madrid EL PAIS in Spanish 8 Feb 85 p 27

[Article by Carmen Marino: "Nine Programs for Spanish Science"]

[Excerpt] Nine research programs, of which four, covering microelectronics, agroenergy, aquaculture and high-energy physics, are already being implemented, will determine the priorities on which Spanish scientific policy will be based in the coming years. Resources, financing and the training of scientific personnel as such will be subordinated to the requirements of these programs, all of which must reflect the characteristics demanded by the future law on the development and coordination of scientific and technical research (science law). Along with these main programs, there will be others with more limited scope--the sectorial plans and those for the autonomous communities.

The nine programs will serve as a definitive catalogue of the national interests when the science law is approved, and other future programs may be added to them.

The microelectronics, agroenergy and aquaculture programs were approved by the preceding legislature, but according to sources at the Ministry of Education and Science, they have had to be reorganized because they proved unworkable in their original form, generally due to lack of realism, with the failure to allow for the limited scientific and technical infrastructure our country has.

The most illustrative example is the aquaculture program, which was approved without consideration of a very small detail of great importance: there is no one in Spain familiar with aquaculture to carry out the program. And if this were not enough, the scientific and technical infrastructure is practically nonexistent. It is therefore not surprising that the only part of the program under way at the present is precisely the plan for the training of aquaculture technicians, with the goal of providing 34 individuals with college degrees, including doctorates, in foreign centers in this specialty over a minimal period of a year.

The priority interest given to the development of aquaculture (the cultivation of aquatics) is designed to cope with the needs of Spain, the resources of which are declining, while at the same time attempting to develop a powerful export industry in this sector. "During the next 4 years, the program

plans to develop reproductive and prefattening techniques for 12 species of commercially marketable molluscs, crustaceans and fish, as well as developing aspects pertaining to their nutrition, genetics and pathology," stated Robert Fernandez de Caleyá, research project coordinator for the Scientific and Technical Research Advisory Commission (CAICYT).

Aquacultural engineering projects will also be drafted for the cultivation of these species, and the development and modernization of industrial installations for their production will be launched. In addition, the geographic areas of interest for aquaculture must be located, and research will be undertaken on the larval development of the species which can be cultivated.

Microelectronics Center

The goals of the microelectronics program will be oriented toward strengthening the technology of this industry in Spain, promoting basic research, studies and development of integrated circuits as well as other devices, both integrable and discrete, including optoelectronic contrivances and sensors. Similarly, research and development on technological materials and processes and equipment for application in microelectronics will be pursued,

Plans also call for encouraging the development of design technology and the verification of integrated circuits, as well as the design and production of advanced hybrid circuits.

To achieve this, in addition to drafting a plan for research and technical personnel which will provide specialists in the design of integrated circuits and microelectronic technology within 4 years, a national microelectronics center will be established, with headquarters both in Madrid and Barcelona. It will probably begin operations before the end of the year. Plans call for staffing the center with 81 researchers and employees and 72 scholarship students. A total of 2.12 million pesetas will be invested in Barcelona, and 1.668 million in Madrid.

The government will invest almost 6 billion pesetas in the establishment of national research centers for microelectronics and biotechnology, Minister of Education and Science Jose Maria Maravall announced last month. According to the plans of the ministry, the two centers will be in full operation within 3 years, and will come under the jurisdiction of the Higher Scientific Research Council (CSIC), although its structure will be different from those of the other CSIC centers.

The agroenergy program had to be reworked on the basis of concrete goals since, according to the present administration, it was conceived almost as if it were an alternative to the country's energy plans. Through the agroenergy program, plans call for producing and converting biomass for energy purposes, as well as utilizing and recycling biomass from the waste produced by industrial and urban centers of activity.

Biomass Cultivation

Currently the possibility of producing profitable cultivated biomass is being studied. Herbaceous crops such as potatoes and sweet sorghum; aquatic species such as macrophytes and algae; and woody species, basically those which grow rapidly.

The cost resulting from the processing of such biomass and that obtained from waste and contaminants into fuel energy products will also be studied.

The plan to promote high-energy physics was approved in February of last year to take advantage of Spain's return to membership in the European Council for Nuclear Research (ECNR). The program providing for the training of technical personnel in the ECNR is scheduled to last until 1988, which date coincides with the end of the transitional period in Spain's entry into this body. The strengthening of experimental research is among its scientific goals.

Plans call for increasing the number of physicists specializing in high energy to 100, from the present 43. Plans also call for developing the technological infrastructure, and the establishment of a national statistical network affiliated with the ECNR.

As to the transfer of technology, an effort will be made to effect this through the development of technological contracts and through the training of technical personnel.

With regard to economic profitability, the priority goal is to ensure that the ECNR allocates contracts to Spanish public bodies and enterprises in an amount at a minimum which is the equivalent of 50 percent of the Spanish annual quota.

According to Roberto Fernandez de Caleyá, the CAICYT, which to date has been known to appeal for research projects or plans coordinated with the enterprises, is, with these new programs which are at various operational stages, pursuing an activity such as has not previously been seen, in connection with the scheduling of research plans.

5157

CSO: 3698/284

SCIENTIFIC AND INDUSTRIAL POLICY

PHILIPS REORGANIZES AUDIO-VISUAL, HOUSEHOLD PRODUCTS BRANCHES

Rotterdam NRC HANDELSBLAD in Dutch 28 Mar 85 p 15

[Report by Dick Wittenberg: "Philips Plans Intensive Restructuring; 725 million (guilders) of Operating Results Destined for Reorganization"]

[Text] Eindhoven, 28 March--The 725 million guilders which Philips put aside last year for restructuring will be used to speed up the process of rationalization and for eliminating overcapacity in some sections. The closing down of some factories is not out of the question. At this moment nothing can be said as to the consequences for the job market. The board of directors of Philips announced this in an explanatory statement in the 1984 annual report.

Philips President Dr W. Dekker hinted that the new reorganization must be seen as an expression of strength, contrary to the [financial] reconstruction operation at the beginning of the eighties which was dictated by pure self-preservation. Last year the company unexpectedly witnessed a rapid growth in operating results due to a number of incidental windfalls, such as the economic revival in the United States and the increase in value of the American dollar. In order to correct the flattering picture to some extent and moderate the expectations for this year, the board of directors decided to take advantage of the opportunity to strengthen its competitive position by giving a new impetus to restructuring. "We take the position that these investments will rapidly yield profits in the future," said Dekker.

According to Engineer M. Kuilman, vice president of Philips, the enterprise normally only needs between 100 and 200 million guilders per year for the usual organizational adjustments. He called a supplemental expenditure of about 1 billion guilders "essential due to the changing nature of the competition." Kuilman pointed out that the low-wage countries increasingly resort to automatization and lengthening of hours of operation. "If we are not to lose ground, we will have to continue working on improving flexibility, efficiency and quality, and then we should also turn to a lengthening of the operating hours," according to the vice president of Philips. That approach automatically leads to new restructuring."

Image and Sound

The reorganization will be aimed primarily at the image and sound product division and at the household appliances product division. Philips has set aside 295 million guilders for the image and sound sector. For the restructuring of the household appliances sector 119 million guilders has been reserved. Both sectors, which together represent about one third of the Philips sales, showed disappointing results last year. The image and sound product division suffered a loss of 416 million guilders in 1984. The main causes were the disappointing market development and the industrial overcapacity in Europe. Also the startup costs of VHS video recorders and other new products were affecting the operating results. Greater automatization and a decrease in the number of television factories in Europe are expected to lead to a considerable improvement even this year.

The household appliances sector is also up against a stagnating market, overcapacity and deadly competition. Last year the operating result decreased from 427 million to 351 million guilders. In this division also, the number of manufacturing establishments will be reduced. Furthermore, flexible production automatization and improvement of logistics must result in increased flexibility.

Priorities

In the introduction to the 1984 annual report Dr Dekker writes that, in the interest of the continuity of the company, the company feels compelled "to establish priorities with respect to the scope of our enterprise and also to make a selection of the geographic areas at which we want to aim further expansion of the company." In an explanatory note the Philips president stated that task forces under the leadership of members of the board of directors are carefully examining all the company activities again. They are studying which components might be given up, for example because they result in losses or because they are not of great technological importance. "Such activities could disappear more or less noiselessly, or perhaps should better be transferred to others," according to Dekker. "In that manner we create room for money and management talent. We will once more clamp down carefully.- But I don't expect that any large spectacular components will be judged superfluous."

The Philips president stated that in the coming years the company will put great emphasis on strengthening its position in the United States and the Far East because those areas offer the best prospects. "Europe misses so many opportunities--it gives you the chills," Dekker said. Nevertheless he stressed: "We won't leave Europe, but we certainly want to make our investments where they yield the most profit." That policy is also clear in the 1984 annual report. Over half of the 3.8 billion guilders in investments still end up in Europe. Yet the growth is strongest in the United States and Asia. In these areas almost a doubling of the investments was realized last year.

United States

Philips had published the annual figures for 1984 already previously. The company booked a net profit of 1,113 million guilders with sales of 53.8 billion guilders. The number of employees rose by 2,900 to 344,000. This year Philips expects the increase in volume of sales to turn out lower than the 10 percent which was realized in 1984. In that, an important role is played by the fact that the economic growth in the United States will be weaker than in the past year. Also important is the fact that the market for electronic components, which increased in 1984 by about 50 percent, will increase considerably less this year. However, Philips still expresses hope that "a gradual structural improvement of profit will continue in the coming years."

8600

CSO: 3698/349

SCIENTIFIC AND INDUSTRIAL POLICY

MAX-PLANCK INSTITUTE REPORT OUTLINES 1984 ACTIVITIES

Zurich CHEMISCHE RUNDSCHAU in German 25 Jan 85 p 3

[Unattributed article: "Research at Max-Planck Institutes--Looking Back at 1984" ; n.b: FBIS has ordered a copy of this report and will publish excerpts as appropriate]

[Text] The Max-Planck Society (MPG) has just published its yearbook for 1984 which provides a detailed look at its research activities.* In addition to a number of articles and a statement of aims regarding research policy, the yearbook contains the activity reports of the 60 Max-Planck institutes currently in operation. The yearbook's purpose is to provide information both for professionals and the public. For this reason, many of the institutes merely provide summaries of research findings within a limited area of research which were collected over a period of several years.

The introduction contains a report on the Max-Planck Society's research policy and research planning. This section deals with support for the younger generation of scientists, with organizational changes at the institutes and with new projects. The yearbook reports that a concentrated research project in genetic engineering is being undertaken by three working groups at the Max Planck Institutes for biochemistry and psychiatry in conjunction with the University of Munich. In addition, efforts to promote social science research in the Max-Planck Society have been crowned with success. As of 1985, Prof Renate Mayntz will be in charge of the as yet to be established Max-Planck Institute for Social Research which will deal with the analysis of social institutions.

In 1983, the Max-Planck Society and the institutions administered by it had a total of 8,404 staff positions available to it. 2,182 of these positions were reserved for scientific personnel. 239 staff members were being paid out of project assistance funds. The society also employed 2,972 visiting scientists and grantees; among them 974 doctoral candidates and 525 trainees. Based on preliminary and as yet unaudited figures, the society's 1983 business year closed out with income and expenditures totaling about DM 999.5 million.

* "Max-Planck-Gesellschaft--Jahrbuch 1984" [Max-Planck Society 1984 Yearbook], Goettingen, Vandenhoeck & Ruprecht, 930 pp, DM 78.00

The change of presidents was an important MPG event in 1984. Looking back on his 12-year tenure as president, Prof Reimar Luest recalls that the start of his term in office coincided with a budget stagnating in real terms and a staff which was no longer growing. But even in the absence of real growth, the Max-Planck Society did manage to complete a large number of new research projects. Prof Heinz A Staab, the new president, points out that he views his assumption of the post in terms of continuity. His aim, he says, will be to assure and improve the quality of research being done at the institutes so as to be able to develop new research activities. Toward this end, collaboration between the universities and the various Max-Planck institutes will have to be increased.

9478

CSO: 3698/386

BRIEFS

HAMBURG TECHNOLOGY CENTER (VWD)-- Incited and supported by the Technology center in Berlin of the German Engineering Society (VDI), there will be a High Tech Center starting next year in Hamburg-Wandsbeck in a former printing house. Those interested can rent areas at a price of 8 to 12 DM per square meter, and can also obtain management, marketing, and financial consultation, and, for a token fee, an infrastructure with reception, EDP, communication equipment, and conference rooms. The principal is the Hamburg Construction Company Buell + Dr. Liedtke, who spent DM 6 million for the building. In the initial phase, close to 5,000 square meters is usable, that will be occupied by 25 companies with approximately 250 employees. Sixteen hundred square meters is firmly leased to nine companies. A company mix of micro-electronics laser, sensor and energy technology, environmental protection, and biotechnology is contemplated. [Text] [Munich COMPUTERWOCHE in German 16 Nov 84 p 46] 12902

R&D INVESTMENT AT BOSCH--The consolidated worldwide sales of the Bosch Group in 1984 will exceed the mark of DM 15 billion (1983: DM 14.35 billion). In the first five months of this year, the companies produced a sales surplus of 20 percent. A rate of increase of approximately 6 percent is expected for the entire fiscal year. Domestically, the improved order entry made it possible to establish more than 1,100 new jobs. The number of employees in the Federal Republic of Germany therefore rose to 70,393 by the end of the year. The DM 739 million that was used domestically in the Bosch Group only for research and development, which is 6.7 percent of sales, is also an investment in the future. In applied research, preliminary development, and product development, there were 6,925 employees in the past year, of whom 729 were in the regional companies. A large number of patents were applied for. The world-wide interest in the Bosch products and processes manifests itself in active licensing, now as ever. Our picture shows the first presentation of the new Bosch SR800 pivot-arm robot on October 3, 1984, in Stuttgart-Feuerbach (report follows in the M+W issue 26) [Text] [Coburg MASCHINE + WERKZEUG in German 7 Nov 84 p 6] 12902

BULL OF FRANCE ISSUES LOAN--The Bull group has announced the issue of a 700-MF [million francs], variable-interest-rate loan to finance its investments in industry and research. We are reminded that, under its plan, Bull expects to recover its profitability as of 1985, and must invest over 10 billion francs between 1983 and 1986, or twice as much as it did between 1979 and 1982. [Text] [Paris ELECTRONIQUE ACTUALITES in French 25 Jan 85 p 7] 9399

NEW LAW ON FRENCH RESEARCHERS--The decrees on the new regulations governing the research personnel of the public sector's research entities have finally appeared in the JOURNAL OFFICIEL. Eighteen months of discussions have gone into the formulating of these regulations to conform to the research orientation and programming law passed by Parliament in July 1982. The principle of permanent civil service status now has the force of law, greatly facilitating mobility among the different research entities, mobility towards institutes of higher learning, and mobility towards industry. Henceforth, a researcher who goes to work in an industrial enterprise can at any time return to his or her entity of origin in case of need. His or her personal status will not be adversely affected. A few differences of detail remain, however, among the CNRS [National Center for Scientific Research], INSERM [National Institute of Health and Medical Research] and INRA [National Institute of Agronomic Research]. The principle of competitive examinations has been introduced with regard to promotions, and that of boards of examiners for recruitment. The new regulations are applicable to all categories of research personnel: Researchers, engineers, technicians and administrative staff. [Text] [Paris SCIENCES & AVENIR in French Feb 1985 p 22] 9399

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